NUEXCO

Monthly Report

January 1992 Number 281

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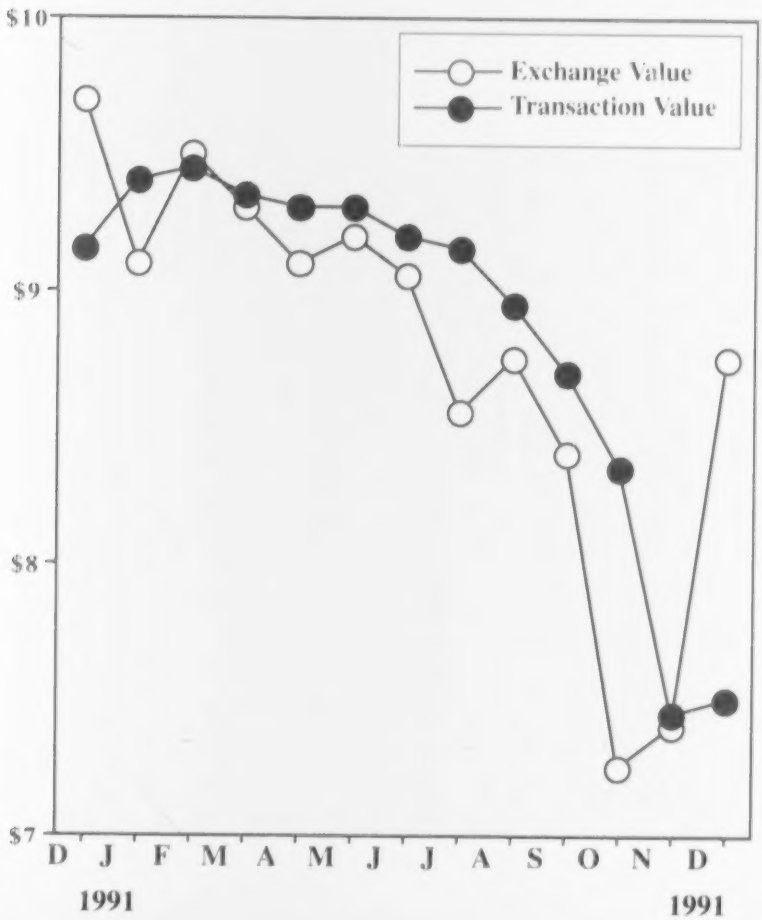

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To Our Readers

We are pleased to announce that James J. Graham is joining CONCORD/NUEXCO in Denver where he will work in a senior management role in several companies including NUEXCO, Energy Fuels, and CONCORD. Jim was formerly President and Chief Executive Officer of Total Minerals Corporation. He joined Total in 1984 as Executive Vice President of Total Energy Resources, Inc., the US holding company for TOTAL of France, and assumed his present position in 1988. He was also President and Chief Operating Officer of Malapai Resources Company, an indirect wholly owned subsidiary of Electricité de France. Prior to joining Total, he was President of General Exploration Company and earlier held senior positions with Zapata Corporation and Texasgulf, Inc.

Jim received his Bachelor of Science degree in Metallurgical and Mineral Engineering in 1970 from Michigan Technological University.

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Market Values Summary

NUEXCO Market Values	This Report December 31, 1991	Last Report November 30, 1991	12 Months Ago December 31, 1990
EXCHANGE VALUE [1]	**$8.75** / lb equivalent U_3O_8	$7.40	$9.70
UF_6 VALUE [2]	**$26.00** / kg U as UF_6	$22.75	$28.75
LOAN RATE [3]	**3.0%** / annum	3.5%	3.5%
CONVERSION VALUE [4]	**$1.55** / lb U as UF_6	$1.55	$1.45
SWU VALUE [5] **(0.3 % tails assay)**	**$70** / SWU	$68	$51
TRANSACTION VALUE [6]	**$7.50** / lb equivalent U_3O_8	$7.45	$9.15
Transactions	**26**	22	19
Months	**3**	3	3
Millions of Pounds	**8.0**	4.9	3.1

DEFINITIONS

1 The **Exchange Value** is NUEXCO's judgment of the price at which transactions for significant quantities of natural uranium concentrates could be concluded as of the date indicated.

2 The **UF_6 Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of natural uranium hexafluoride could be concluded as of the date indicated.

3 The **Loan Rate** is NUEXCO's judgment of the annual interest rate at which uranium loans could be concluded as of the date indicated.

4 The **Conversion Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of conversion services could be concluded in the secondary market as of the date indicated.

5 The **SWU Value** is NUEXCO's judgment of the price at which spot and near-term transactions for significant quantities of enrichment services could be concluded as of the date indicated.

6 The **Transaction Value** is a weighted average price of recent natural uranium sales transactions. The calculation is based on prices paid in:

a) Transactions closed within the previous three month period for which delivery is scheduled within one year of the transaction date;

b) At least ten transactions;

c) Transactions involving a sum total of at least 2 million pounds equivalent U_3O_8.

DERIVATIONS AND COMMENTS

- All **Market Values** are expressed in terms of US$.
- All **Market Values** are based on:
  - Data from recently completed transactions.
  - Data from pending transactions.
  - Firm bids to buy or borrow, and firm offers to sell or lend.
  - Prices purchasers or rates borrowers have expressed a willingness to pay, but for which NUEXCO is not aware of firm bids to buy or borrow and prices sellers or rates lenders have expressed a willingness to accept, but for which NUEXCO is not aware of firm offers to sell or lend.
- Prices associated with deliveries under old or renegotiated contracts or other than arm's-length transactions are not included in the determination of these **Market Values**.
- In the determination of prices, NUEXCO does not consider charges for transportation other than that customarily provided by suppliers.
- The prices of services or materials delivered under long-term contracts with primary suppliers are not considered in the determination of the listed values.
- For the **SWU Value**, NUEXCO converts SWU prices at varying tails and product assays to equivalent SWU prices at a tails assay of 0.30 weight-percent U^{235} and a product assay of 3.0 weight-percent U^{235}, assuming feed costs corresponding to the NUEXCO **Exchange Value** and **Conversion Value** determined as of the same date.
- In calculating the **Transaction Value**, NUEXCO does not account for the price of uranium delivered in connection with contracts which call for "market price" mechanisms. This exclusion applies particularly to contracts in which delivery prices are expressed as a function of future **Exchange Values** or any other indeterminate variable. Also excluded from the calculation are any other transactions in which the delivery price is defined in such a way that it can not currently be determined.
- The sample time for the **Transaction Value** is extended as necessary to satisfy the minima for the number of transactions and quantity of material. Other currencies are converted to US dollars using conversion rates in effect on or near the transaction date.

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NUEXCO

MARKET REVIEW

DECEMBER MARKET REVIEW

(as of December 31, 1991)

OVERVIEW

Prices increased significantly in December, as the market continued the upturn that began late in November. A large increase in discretionary demand, coupled with more cautious sellers, led the Exchange Value to rise $1.35, to $8.75 per pound U_3O_8. The UF_6 Value also increased, climbing $3.25, to $26.00 per kgU as UF_6.

Market volume also increased in December, exceeding 3.7 million pounds equivalent U_3O_8 in eight near-term transactions. Seven longer term transactions also were reported, totalling over 13 million pounds equivalent U_3O_8 for delivery during 1992-2000. Four of these occurred in mid-1991.

The preliminary 1991 total spot and near-term sales volume now equals 30.4 million pounds equivalent U_3O_8 in 111 transactions (**Table 1**). This volume lags behind both 1989 and 1990 volume, but is still the third largest ever. The 1990 level of 40.1 million pounds remains the spot market volume record.

Few borrowers, many lenders, and lower overall interest rate structure finally forced the Loan Rate down one-half percentage point, to 3.0 percent per annum. No loans were reported from December.

Table 1
NEAR-TERM URANIUM SALES SUMMARY

	December 1991		Year-to-Date	
	No. of Sales	Volume[1]	No. of Sales	Volume[1]
Concentrates	5	0.8	78	18.8
Natural UF_6	2	2.7	20	7.6
EUP	1	0.2	13	4.0
Total[2]	**8**	**3.7**	**111**	**30.4**

[1] Million pounds equivalent U_3O_8
[2] Due to independent rounding, columns may not equal total.

The Conversion Value remained unchanged at $1.55 per pound U as UF_6. Two conversion transactions were reported: one near-term sale for a small quantity, and one intermediate-term sale to a utility for a large quantity of conversion services.

The SWU Value resumed its upward climb, and rose two dollars, to $70 per SWU. Only two enrichment sales were reported, both involving small quantities of SWU.

URANIUM AND CONVERSION

The record-low prices of late October and early November attracted numerous discretionary buyers into the market. This increase in demand, combined with more cautious sellers, led to rapidly rising prices in early December. But toward the end of the month, prices had risen to levels that led many potential buyers to reevaluate any purchase decisions. The **Exchange Value** ended December at **$8.75** per pound U_3O_8—a $1.35 increase from November 30.

Market activity declined late in the month as prospective buyers exited the market in reaction to rising prices. The higher prices near month-end caused at least three buyers seeking a total of almost three million pounds equivalent U_3O_8 to defer any purchases, causing the upward price pressure to subside. Thus, at year end, the future direction of the market was once again uncertain. The market continues to be characterized by abundant supply and limited demand, so near-term price movements will result largely from market participants' changing perceptions of and reactions to market events.

Although activity slowed in the latter half of December, market volume still totalled a healthy 3.7 million pounds equivalent U_3O_8 in eight near-term transactions. Five concentrates sales from intermediaries to producers and utilities were reported and totalled over 800 thousand pounds. The three remaining purchases, two by utilities, one by a producer, involved natural and enriched UF_6 and totalled over 2.9 million pounds equivalent U_3O_8.

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The UF_6 market was fairly active, as the large volume of UF_6 sold in December demonstrates. This market reflected the same conditions as the concentrates market, and the **UF_6 Value** rose $3.25, to **$26.00** per kgU as UF_6. This 14.3 percent increase is the third largest jump of the UF_6 Value since it was first published on April 30, 1985.

* * *

In the intermediate and long-term market, seven sales of concentrates and natural UF_6 were reported, totalling over 13 million pounds equivalent U_3O_8. Utilities made all seven purchases for delivery during the period 1992 through 2000, although four of the transactions occurred in mid-1991.

* * *

The **Transaction Value** edged up $0.05, to **$7.50** per pound U_3O_8 based on 26 transactions over three months involving 8.0 million pounds equivalent U_3O_8. Lower-priced sales from October and November prevented any large increases in the Transaction Value.

* * *

Active uranium supply declined by over one million pounds from November 30, finishing December at **4.0** million pounds equivalent U_3O_8. While demand was quite high early in December, by month-end most discretionary buyers had concluded purchases or had withdrawn from the market in the face of higher prices. As a result, **active uranium demand** dropped over two million pounds, to **860** thousand pounds equivalent U_3O_8. Consequently, the **supply/demand ratio** rose to **4.7**.

* * *

The **Loan Rate** succumbed to the downward pressure of the past few months and declined to **3.0** percent per annum. This was the first change in the Loan Rate in over four years. Abundant loan supply, virtually no demand, and a very low interest rate structure in the USA all combined to push the Loan Rate down one-half percentage point. The three percent rate equals the Loan Rate's lowest level ever, which was last reached in July 1987. No loans were reported from December.

* * *

The **Conversion Value** remained unchanged at **$1.55** per pound U as UF_6. Two conversion transactions were reported: in one, a European utility purchased a small amount of conversion services for near-term delivery; in the other, a US utility purchased a large quantity for delivery in 1992 and 1993.

Table 2
NEAR-TERM SUPPLY/DEMAND SUMMARY

	Active Supply[1]	Active Demand[1]
• Uranium (thousand lbs equivalent U_3O_8)	4,000	860
• Supply/Demand Ratio:	4.7	
• Loan (thousand lbs equivalent U_3O_8)	6,020	0
• Conversion (thousand lbs U as UF_6)	880	805
• SWU (thousand SWUs)	250	3

[1] Supply and Demand tables in the Market Review section of this Report provide details for each category.

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ENRICHMENT SERVICES AND ENRICHED URANIUM PRODUCT

After remaining at $68 for two consecutive months, the **SWU Value** resumed its climb, and reached **$70** per SWU on December 31. Tighter SWU supply continues to push prices higher. Only two enrichment transactions were reported, both for small quantities of SWU sold to US utilities. One of the sales involved SWU contained in enriched uranium product (EUP). In a year when over 50 entities evaluated SWU offers sometime during the year, the enrichment market completed the year fairly quietly, with only three buyers evaluating near- and long-term SWU offers.

Table 3
ENRICHMENT PRICES
(December 31, 1991)

Prices	This Month Report 281	Last Month Report 280	12 Months Ago Report 269
NUEXCO SWU Value ($US per SWU)	70	68	51
US DOE SWU prices: ($US per SWU)			
USEC	121.50[1]	121.50[1]	117.85[2]
APC	153.00[3]	153.00[3]	153.00[3]
Requirements	157.00[3]	157.00[3]	157.00[3]
Incentive Price (IP2)	104.67[4]	104.67[4]	100.68[5]
Calculated worth of enriched UF_6[6]: ($US per KgU as UF_6)			
2.0 % U^{235}	227	209	205
2.5 % U^{235}	318	295	282
3.0 % U^{235}	412	382	362
3.5 % U^{235}	508	472	444
4.0 % U^{235}	606	564	526
4.5 % U^{235}	705	656	609

[1] Effective 10/1/91.
[2] Effective 10/1/89 to 9/30/91.
[3] Effective since 10/1/84.
[4] Provisional IP2 for FY92: Effective 10/1/91 to 9/30/92, for up to 30% of annual requirements.
[5] IP2: Effective 10/1/90 to 9/30/91, for up to 30% of annual requirements.
[6] Calculated using the NUEXCO Exchange Value, Conversion Value, SWU Value and 0.30 % U^{235} tails assay.

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RECENT TRANSACTIONS

Uranium Sales [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U_3O_8)	Price Within Percentage Range [2] of Current Exchange or UF_6 Value	Buyer	Seller	Remarks
5308	1992	1,001-3,000	R	Producer	R	UF_6
5309	1992-1994	3,001-6,000	R	Utility	R	UF_6
5311	1992	Less Than 50	Below 90	Utility	Intermediary	
5313	1995-1999	601-1,000	See Remarks	Utility	Producer	Occurred earlier in 1991
5314	1995-1999	1,001-3,000	See Remarks	Utility	Producer	Occurred earlier in 1991
5315	1995-1999	1,001-3,000	See Remarks	Utility	Producer	Occurred earlier in 1991
5316	1994-2000	1,001-3,000	See Remarks	Utility	Producer	Occurred earlier in 1991
5318	1992-1993	101-300	Below 90	Utility	Intermediary	UF_6
5319	1991	101-300	Below 90	Producer	Intermediary	
5320	1992	101-300	90-97	Producer	Intermediary	
5324	1992	50-100	98-102	Producer	Intermediary	
5325	1992	101-300	Below 90	Utility	Intermediary	
5326	1992	101-300	90-97	Utility	Intermediary	UF_6
5327A	1992	101-300	See Remarks	Utility	Intermediary	Contained in EUP
5328	1993	301-600	103-110	Utility	Intermediary	UF_6

R means that NUEXCO either does not know, or that NUEXCO has restricted that information to protect client or source confidentiality.

[1] Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information.

[2] The ranges *Below 90, 90-97, 98-102, 103-110, Above 110,* represent percentages (rounded to whole numbers) of the appropriate current Exchange Value or UF6 Value. The endpoints of each range are included within that range.

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MARKET REVIEW

RECENT TRANSACTIONS

Natural Uranium Loans [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds equivalent U_3O_8)	Price Within Percentage Range [2] of Current Loan Rate	Borrower	Lender	Remarks
No loans of natural uranium are reported						

Conversion Sales [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity (thousand pounds of U equivalent)	Price Within Percentage Range [2] of Current Conversion Value	Buyer	Seller	Remarks
5307	1992	50-100	R	Utility	R	
5321	1992-93	1,001-3,000	See Remarks	Utility	Converter	Series of Fixed Prices

Enrichment Sales [1]

NUEXCO Transaction Number	Delivery Period	Approximate Quantity [3] (thousand SWU)	Price Within Percentage Range [2] of Current SWU Value [4]	Buyer	Seller	Remarks
5323	1992	Less Than 50	98-102	Utility	Intermediary	
5327B	1992	Less Than 50	See Remarks	Utility	Intermediary	Contained in EUP

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[1] Transactions listed are not limited to those in which NUEXCO was involved, but also include others of which NUEXCO is aware. NUEXCO may delay reporting some transactions in order to protect proprietary information.

[2] The ranges *Below 90, 90-97, 98-102, 103-110, Above 110*, represent percentages (rounded to whole numbers) of the appropriate current Market Value. The endpoints of each range are included within that range.

[3] If tails assay is unknown or unspecified, NUEXCO's calculation of SWU quantity assumes 0.30 % tails assay.

[4] Prices are usually normalized to 0.30 % tails assay. When prices and SWU values are expressed as discounts from a reference price (e.g., X dollars less than DOE's USEC base price at time of delivery), the percentage price range is based on the discounted prices, not on the reference price.

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SUPPLY AND DEMAND

Uranium Supply

NUEXCO Project Number	Quantity (Thousand Pounds equivalent U_3O_8) Spot or Near-term [1]	Intermediate or Long-term [2]	Delivery Period	Remarks
AVAILABLE TO PURCHASE:				
ACTIVE				
91-1292*	300	—	1992	
91-1502	500	—	1992	
91-1505*	500	—	1992	
91-1506	500	—	1992	
91-1507	500	—	1992	
91-1511	260	—	1992	UF_6
91-1512	785	—	1992	UF_6
91-1241	655	650 per year	1992-1996	
91-1268	—	1,000 per year	1992-2001	
TOTAL	**4,000**			
INACTIVE	**4,430**			
AVAILABLE TO LOAN:				
ACTIVE				
90-1057A	310	—	—	UF_6
91-1084	3,900	—	—	U_3O_8
91-1174	1,000	—	—	U_3O_8
91-1219	260	—	—	U_3O_8
91-1220	325	—	—	UF_6
91-1260	225	—	—	U_3O_8/UF_6
TOTAL	**6,020**			
INACTIVE	*None reported*			

* New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: *none*
Active Projects removed since last month: 90-1307, 91-1503A

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MARKET REVIEW

SUPPLY AND DEMAND

Uranium Demand

NUEXCO Project Number	Quantity (Thousand Pounds equivalent U_3O_8) Spot or Near-term [1]	Intermediate or Long-term [2]	Delivery Period	Remarks
INQUIRIES TO PURCHASE:				
ACTIVE				
91-1272*	500	—	1992	
91-1293A*	10	—	1992	UF_6e
91-1297*	150	—	1992	
91-1516*	200	—	1992	
91-1118	—	300 per year	1993-1998	U_3O_8/UF_6
91-1184	—	350 per year	1993-1997	
91-1290*	—	310 per year	1995-1999	U_3O_8/UF_6
91-1294*	—	250 per year	1996-2000	
91-1197	—	2,210	1992-1997	U_3O_8/UF_6
91-1227A	—	60	1992-1994	UF_6e
91-1245	—	1,000	1993-1997	
91-1283*	—	5,225	1994-2000	U_3O_8/UF_6
TOTAL	**860**			
INACTIVE	**1,750**			
INQUIRIES TO BORROW:	*No inquiries to borrow are reported*			

* New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: *none*
Active Projects removed since last month: 91-1234, 91-1235, 91-1255, 91-1259, 91-1263, 91-1271, 91-1277

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SUPPLY AND DEMAND

Conversion Supply and Demand

NUEXCO Project Number	Quantity (Thousand Pounds U as UF_6) Within 3 Years [1]	Beyond 3 Years [1]	Delivery Period	Remarks
AVAILABLE FOR SALE:				
ACTIVE				
91-1500	440	—	1992	
91-1501	440	—	1992	
TOTAL	**880**			
INACTIVE	*None reported*			
INQUIRIES TO PURCHASE:				
ACTIVE				
91-1275	620	—	1992	
91-1301*	185	—	1992	
91-1299*	—	330	1993-1997	
TOTAL	**805**			
INACTIVE	*None reported*			

* New or revised since last month.

[1] Measured from the date of this Report.

Active Projects reclassified as Inactive since last month: *none*
Active Projects removed since last month: 91-1264

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MARKET REVIEW

SUPPLY AND DEMAND

SWU Supply And Demand

NUEXCO Project Number	Quantity (Thousand SWUs) Spot or Near-term [1]	Intermediate or Long-term [2]	Delivery Period	Remarks
AVAILABLE FOR SALE:				
ACTIVE				
91-1515*	50	—	1992	
91-1509	200	—	1992	
TOTAL	**250**			
INACTIVE	**785**			
INQUIRIES TO PURCHASE:				
ACTIVE				
91-1293B*	3	—	1992	UF_6e
90-1196	—	60 per year	1995 on	
91-1142	—	75 per year	1995-2000	
91-1152	—	2,700	1995-2001	
91-1171	—	560	1995-1998	
91-1227B	—	35	1992-1994	UF_6e
91-1232	—	400	1993-1994	
91-1250	—	45	1993	UF_6e
TOTAL	**3**			
INACTIVE	**215**			

* New or revised since last month.

[1] For delivery within one year, measured from the date of this Report. This category excludes material deliverable within one year under other than spot or near-term contracts.

[2] For delivery beyond one year, measured from the date of this Report.

Active Projects reclassified as Inactive since last month: *none*
Active Projects removed since last month: 90-1078D, 91-1066

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MARKET VALUES EXPRESSED IN SELECTED CURRENCIES

Exchange Value[1]

Country (currency)	per lb equivalent U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)
Australia (dollar)	11.51	9.43	12.58	29.93	24.52	32.71
Belgium (franc)	273.69	247.33	299.57	711.54	642.99	778.81
Canada (dollar)	10.11	8.40	11.25	26.29	21.83	29.25
EC (ecu)	6.53	5.92	7.17	16.96	15.40	18.64
Finland (markka)	36.15	32.49	35.13	93.97	84.46	91.34
France (franc)	45.33	41.03	49.32	117.84	106.67	128.23
Germany (mark)	13.26	12.02	14.50	34.46	31.26	37.70
Italy (lira)	10,040	9,052	10,922	26,102	23,533	28,395
Japan (yen)	1,092	960.91	1,309	2,839	2,498	3,402
Netherlands (guilder)	14.94	13.55	16.35	38.83	35.23	42.50
So. Africa (comm. rand)	23.99	20.72	24.88	62.36	53.87	64.68
So. Korea (won)	6,639	5,579	6,931	17,260	14,505	18,018
Spain (peseta)	845.08	764.78	927.79	2,197	1,988	2,412
Sweden (krona)	48.42	44.02	54.56	125.89	114.45	141.83
Switzerland (franc)	11.87	10.61	12.38	30.86	27.59	32.18
Taiwan (dollar)	223.12	190.62	258.36	580.07	495.58	671.69
UK (pound)	4.68	4.19	5.04	12.17	10.88	13.10
US (dollar)	8.75	7.40	9.70	22.75	19.24	25.22

Transaction Value[1]

Country (currency)	per lb equivalent U_3O_8 as Concentrates			per kg U as Concentrates		
	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)
Australia (dollar)	9.87	9.50	11.87	25.66	24.69	30.85
Belgium (franc)	234.59	249.00	282.58	609.89	647.34	734.65
Canada (dollar)	8.67	8.45	10.61	22.53	21.98	27.59
EC (ecu)	5.59	5.96	6.76	14.54	15.50	17.59
Finland (markka)	30.98	32.71	33.14	80.55	85.03	86.16
France (franc)	38.85	41.31	46.53	101.00	107.39	120.96
Germany (mark)	11.36	12.11	13.68	29.54	31.47	35.56
Italy (lira)	8,606	9,113	10,303	22,373	23,692	26,785
Japan (yen)	935.98	967.41	1,234	2,433	2,515	3,209
Netherlands (guilder)	12.80	13.64	15.42	33.28	35.47	40.09
So. Africa (comm. rand)	20.56	20.86	23.47	53.45	54.24	61.01
So. Korea (won)	5,690	5,617	6,538	14,794	14,603	16,996
Spain (peseta)	724.36	769.95	875.18	1,883	2,002	2,275
Sweden (krona)	41.51	44.32	51.46	107.90	115.22	133.79
Switzerland (franc)	10.17	10.68	11.68	26.45	27.77	30.35
Taiwan (dollar)	191.25	191.91	243.71	497.20	498.93	633.60
UK (pound)	4.01	4.21	4.75	10.43	10.96	12.35
US (dollar)	7.50	7.45	9.15	19.50	19.37	23.79

[1] As of May 1991 Report #273; calculated using currency exchange rates for the last business day of the month, as published in *The Wall Street Journal*. Prior to May 1991 Report #273; calculated using currency exchange rates published in *The Wall Street Journal* on the last business day of the month.

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MARKET REVIEW

Market Values Expressed In Selected Currencies

Conversion Value[1]

Country (currency)	per lb U as UF_6			per kg U as UF_6		
	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)
Australia (dollar)	2.04	1.98	1.88	4.50	4.36	4.15
Belgium (franc)	48.48	51.80	44.78	106.89	114.21	98.72
Canada (dollar)	1.79	1.76	1.68	3.95	3.88	3.71
EC (ecu)	1.16	1.24	1.07	2.55	2.73	2.36
Finland (markka)	6.40	6.80	5.25	14.12	15.00	11.58
France (franc)	8.03	8.59	7.37	17.70	18.95	16.25
Germany (mark)	2.35	2.52	2.17	5.18	5.55	4.78
Italy (lira)	1,779	1,896	1,633	3,921	4,180	3,599
Japan (yen)	193.44	201.27	195.60	426.45	443.73	431.23
Netherlands (guilder)	2.65	2.84	2.44	5.83	6.26	5.39
So. Africa (comm. rand)	4.25	4.34	3.72	9.37	9.57	8.20
So. Korea (won)	1,176	1,169	1,036	2,593	2,576	2,284
Spain (peseta)	149.70	160.19	138.69	330.03	353.16	305.76
Sweden (krona)	8.58	9.22	8.16	18.91	20.33	17.98
Switzerland (franc)	2.10	2.22	1.85	4.64	4.90	4.08
Taiwan (dollar)	39.52	39.93	38.62	87.14	88.03	85.15
UK (pound)	0.83	0.88	0.75	1.83	1.93	1.66
US (dollar)	1.55	1.55	1.45	3.42	3.42	3.20

SWU Value And UF_6 Value[1]

Country (currency)	SWU Value at 0.30 % Tails Assay			UF_6 Value per kg U as UF_6		
	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)	This Month (Dec 31, 1991)	Last Month (Nov 30, 1991)	12 Months Ago (Dec 31, 1990)
Australia (dollar)	92.11	86.68	66.15	34.21	29.00	37.29
Belgium (franc)	2,190	2,273	1,575	813.26	760.36	887.89
Canada (dollar)	80.89	77.16	59.16	30.04	25.81	33.35
EC (ecu)	52.20	54.52	37.71	19.39	18.21	21.26
Finland (markka)	289.17	298.52	184.72	107.41	99.87	104.13
France (franc)	362.60	377.02	259.33	134.68	126.14	146.19
Germany (mark)	106.04	110.50	76.24	39.39	36.97	42.98
Italy (lira)	80,321	83,180	57,426	29,834	27,829	32,372
Japan (yen)	8,736	8,830	6,880	3,245	2,954	3,878
Netherlands (guilder)	119.49	124.52	85.96	44.38	41.66	48.46
So. Africa (comm. rand)	191.89	190.42	130.80	71.27	63.71	73.74
So. Korea (won)	53,111	51,270	36,439	19,727	17,153	20,542
Spain (peseta)	6,761	7,028	4,878	2,511	2,351	2,750
Sweden (krona)	387.38	404.52	286.84	143.88	135.34	161.70
Switzerland (franc)	94.95	97.51	65.08	35.27	32.62	36.68
Taiwan (dollar)	1,785	1,752	1,358	662.99	586.04	765.77
UK (pound)	37.44	38.47	26.49	13.91	12.87	14.93
US (dollar)	70.00	68.00	51.00	26.00	22.75	28.75

[1] As of May 1991 Report #273; calculated using currency exchange rates for the last business day of the month, as published in *The Wall Street Journal*. Prior to May 1991 Report #273; calculated using currency exchange rates published in *The Wall Street Journal* on the last business day of the month.

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RECENT DEVELOPMENTS

China

USTR Action Regarding Chinese Uranium

Due to concerns over intellectual property laws, policies, and practices of the People's Republic of China, the United States Trade Representative (USTR) announced this past November that it was considering action against selected Chinese products under section 301 of the Trade Act of 1974. As a result, there was a possibility that natural uranium concentrates of Chinese origin would have been subject to US import tariffs.

At the time of the initial USTR action, a list of items was published and made available for public review and comment for a thirty-day period ending January 2, 1992. The products included on the extensive list varied from textiles to nuts and bolts. Natural uranium also was included on this initial list. The fact that the items were listed did not imply that there was anything illegal regarding the product. The list was just an enumeration of products imported to the USA from China that could have been selected as a target of tariffs aimed at chastising China for inadequate protection of copyright, patent, and other intellectual property rights.

High-level negotiations were underway between the USTR and the Chinese government to try to resolve the situation and avoid the imposition of duties. While the USTR had until nearly the end of February to make a final decision, it set a deadline for settlement of January 16, 1992. Talks reconvened on January 10, 1992, and after intense negotiations, a settlement on protection of intellectual property was reached. As a result, no final list was published and Chinese uranium will not be subject to US import tariffs.

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RECENT DEVELOPMENTS

INDUSTRY BRIEFS

Ontario Hydro Revises Long-Term Plan

In response to the policies of Ontario's ruling New Democratic Party, Ontario Hydro announced in mid-December that it was dramatically revising it 25-year electric demand and supply plan. The revised plan will forego construction of any new generating plants in the foreseeable future, and instead, will rely upon non-utility generation and demand-side management to meet reduced forecast load growth. This new plan appears to scrap the original expansion program calling for ten new 880-MWe CANDU reactors by 2014.

◆ ◆ ◆

Pakistan Signs Agreement with China for 300-MWe Plant

The Pakistan Atomic Energy Commission announced in Bejing, China, on December 31, that it had signed an agreement to purchase a nuclear power plant from China. A tentative agreement for the reactor purchase was first reached in 1989. The 300-MW plant will be located at Chasma and is scheduled for operation by 1998. Officials stressed that the plant will be subject to IAEA safeguards.

Several Countries Sign Pacts

On December 13 in Vienna, Argentina's president Carlos Menem and Brazil's president Fernando Collor de Mello signed draft safeguards agreements confirming their announced intention not to develop nuclear weapons. The new agreement is viewed as a tremendous boost to the International Atomic Energy Agency's (IAEA) safeguards efforts. The agreement also is compatible with the Tlatelolco Treaty, the Latin America non-proliferation treaty.

In another positive step toward improved nuclear cooperation, India and Pakistan exchanged lists of nuclear facilities as part of a 1988 agreement that the two countries ratified in 1991.

North Korea also made a positive step toward easing world proliferation concerns, confirming on January 7 that it intends to sign an IAEA safeguards agreement by the end of January. The country signed the NPT six years ago, but has not put safeguards agreements in place and has continued to operate several non-safeguarded nuclear facilities.

Chinese and Indian Nuclear Plants Generate First Electricity

On December 15, China's domestically designed and constructed nuclear power plant at Qinshan (300-MWe PWR) achieved criticality. The plant marked this achievement about one year behind its original schedule. Qinshan is China's first nuclear reactor and is expected to reach commercial operation early this year.

In other reactor developments, India announced that its eighth nuclear reactor, Narora 2 (220-MWe PHWR), reached criticality in late 1991, and was expected to reach commercial operation in early 1992.

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Armenia Plans to Restart Nuclear Plant

The independent republic of Armenia (part of the commonwealth of former Soviet republics) has announced that it plans to restart the Armenia nuclear power station near Erevan to help alleviate a serious energy supply shortage. The station, containing two VVER-440s (model 230), was shut down in 1989 due to public opposition and safety concerns. The decommissioning plans have been suspended and the republic hopes to have Unit 2 at the station operating by the end of 1992.

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Germany to Close its Sole Nuclear Waste Site

Germany's only nuclear waste storage facility at Morsleben will be closed following a decision by the Magdeburg District court. The basis of the court decision was that the facility was being operated under a permit issued by the government of the former East Germany. The court ruled that this permit was not automatically valid in unified Germany, despite the Treaty of Unification that granted the facility a ten-year license as of July 1, 1990.

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Hungary's MVMT Becomes Public Limited Holding Company

As of January 1, 1992, Hungary's state electric utility, Magyar Villamos Muvek Troszt (MVMT), became a public limited company, with the eventual goal of becoming a state-owned production and transmission company, with six private distribution companies.

MVMT also decided recently not to send spent fuel from its Paks nuclear power station to the former Soviet Union for disposal. Although an agreement signed in February 1991 allowed for the return of spent fuel, Hungary has elected not to exercise that option and instead has decided to develop some interim storage facilities domestically. The high costs of returning the spent fuel and a desire for more independence in fuel cycle services led to the decision.

Canada to Remove Upgrading Requirements on Uranium

On December 13, Jake Epp, the Canadian Minister of Energy, Mines and Resources announced the government will be phasing out Canada's uranium upgrading policy. Similar to his announcement in 1990 interpreting the policy in light of the US-Canada Free-Trade Agreement, the new policy states that all new uranium sales contracts reviewed by the federal government after December 15, 1991, will not be subject to further processing requirements. Contracts signed before that date will still be subject to the policy, but contracted deliveries after December 31, 1995, will not be required to meet the policy, regardless of when the original contract was signed.

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KEPCO Requests AECL Bid for Wolsong Units

Korea Electric Power Corporation has requested a bid from AECL CANDU (a subsidiary of Atomic Energy of Canada, Ltd.) to provide the nuclear steam supply systems for Units 3 and 4 at KEPCO's Wolsong station. If AECL is awarded the contract, it would become the sole supplier for the station composed of four 629-MWe (net) CANDU reactors. The company built Wolsong 1 in only 61 months and within budget, and also is supplying Unit 2, currently under construction.

Nuclear Electric Permitted to Operate MAGNOX Reactors until 1995

The United Kingdom's Nuclear Installations Inspectorate has given Nuclear Electric approval to operate the MAGNOX reactors at Bradwell, Dungeness, Hinkley Point, and Sizewell to the end of their 30-year lifetimes in 1995. The reactors were given permission earlier in 1991 to operate only through the end of the year until satisfactory results were obtained from reactor vessel embrittlement tests at Trawsfynydd. The continued operation is contingent upon increased monitoring of the pressure vessel welds, and more restrictive start-up conditions.

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European Energy Charter Signed

December 17, 1991, marked the beginning of the European Energy Charter, as 48 parties signed the new agreement. After almost a year and a half of negotiation, the pact finally was concluded. It calls for increasing safety at Soviet-built nuclear stations, improving interconnections of power grids throughout Europe and western Asia, and boosting commercialization of oil and natural gas reserves in the former Soviet Union and eastern Europe. Signatories included 31 European states, 12 former Soviet republics, the independent Baltic state of Latvia, as well as Canada, Japan, Australia, and the USA.

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ESSAY

US National Energy Strategy: Progress and Viewpoint

The following essay was prepared by J. Robert Wolcott, Chairman of CONCORD's International Advisory Committee and former Chairman and President of NUEXCO. Mr. Wolcott comments on recent actions by the US Administration and Congress to legislate a national energy strategy.

Interest in energy policy is not new. President Eisenhower grappled with oil policy. President Nixon pushed "energy independence". President Carter attempted the formulation of a comprehensive policy. All failed in one way or another.

Efforts to define comprehensive national policy continue. Two years ago President Bush directed the Department of Energy to prepare a "National Energy Strategy". An energy package was sent to Congress in 1991, but despite compromises among competing interests, the end result was that not enough votes could be garnered to pass the legislation. Another attempt is expected in 1992.

A major problem with the previous bill was that in attempting to be "comprehensive", too many controversial issues were wrapped into a single package. The next attempt is likely to be divided into several bills; some may pass, others may not. Topics that received the most attention in the 1991 session are expected to get equal scrutiny in 1992. These topics include:

- Mandated automobile gasoline mileage standards—raising required corporate average fuel economy (CAFE) from 27 to 40 miles per gallon.
- Oil exploration in Alaska's Arctic National Wildlife Refuge.
- Simplified licensing of nuclear power plants.
- Increased competition in electrical power production.
- Increase of conservation and renewables development funding beyond the Administration's proposed level.

Concern about the environment, adequate supply of electrical power, and production and conservation of petroleum is the driving force behind consideration of these topics and the major underlying influence shaping debate over energy policy.

ENVIRONMENTAL PROTECTION

Of these three major considerations, environmental protection is foremost. The issues of clean air, acid rain, ozone depletion, and global warming dominate the environmental agenda. Whether production facilities will be built, where they will be built, what technology will be used, and what performance will be specified, are all highly influenced by environmental considerations. Likewise automobile technology, size, design, styling (aerodynamics), mileage, and gasoline composition are similarly influenced.

The emotional drive behind environmental forces is very strong—so strong, in fact, that public policy is being made in advance of, or without, supporting scientific information.

The emotional drive behind environmental forces is very strong—so strong, in fact, that public policy is being made in advance of, or without, supporting scientific information. For example, a $500-million, multi-year, federally funded study by the National Academy of Sciences concluded that acid rain damage was less severe than previously thought, and that many inexpensive solutions were feasible. Yet without waiting for the final report or without apparently using its findings, the Congress and President Bush approved the Clean Air Act estimated to cost the USA $40 billion per year.

Some argue that merely envisioning global warming as a possibility is sufficient justification for drastic action. Environmentalists are pressing for cutbacks in carbon dioxide emissions even though the validity of the scientific data remains controversial and the potential cost of corrective measures is enormous. A recent Department

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of Energy report concluded that reducing carbon dioxide emissions to levels targeted by European countries would cost the United States $95 billion per year, double the price of gasoline, and increase the wellhead cost of natural gas by 400 percent—and all this while scientists are uncertain whether, how much, and why, the earth is warming.

ELECTRICAL ENERGY DEMAND

The whole foundation of Western society is based on electrical energy. Economic and employment losses from insufficient electrical energy supply would lead to intolerable social and political consequences. The costs of a capacity surplus are negligible compared to the costs of a ten-percent shortage. Excess capacity lasts only a few years with growing demand, while even a small capacity shortage may require 10 to 15 years to overcome.

Electrical demand continues to increase at 3 percent to 4 percent per year. Even during the first half of 1991, while in a recession, growth was 2.2 percent. Forecasts project growth rates to continue at that level and could be higher. More electrical products, such as the electric automobile, are on the horizon. (California, nine Northeastern States, and the District of Columbia, have already mandated some electric automobile sales in the latter part of the 1990s).

Kuwait can locate, develop, produce, and ship oil for less than $2 per barrel...in the United States it costs more than $10 per barrel...Average US production per well is only 15 barrels per day, compared to 1,500 for Kuwait and 6,000 for Saudi Arabia.

PETROLEUM: SUPPLY, NATIONAL SECURITY, AND CONSERVATION

Oil supplies 40 percent of the United States' total energy. Of that, transportation accounts for 64 percent; industry, 25 percent; residential and commercial, eight percent; and utilities, three percent. Today, one quarter of US production comes from Alaska's Prudhoe Bay, which may continue to produce for only another decade or two. The United States was the world's largest oil producer and exporter until after World War II. Now the country is the world's foremost oil consumer, a secondary producer, and a major importer. Nearly half the 17 million barrels per day used by the United States is imported.

High production costs limit United States production. Kuwait can locate, develop, produce, and ship oil for less than $2 per barrel. Merely finding and developing oil reserves in the United States costs more than $10 per barrel. As a result, domestic production is gradually declining: production declined by nearly 700,000 barrels per day in one recent year. Additionally, the US has no high-volume wells. Average US production per well is only 15 barrels per day, compared to 1,500 for Kuwait and 6,000 for Saudi Arabia.

Nearly all of the large reserves are foreign. The Yates Field in Texas, once among the world's largest, now has reserves of only 900 million barrels. Saudi Arabia's Ghawar Field, alone, contains reserves of 83 billion barrels—almost 100 times the Yates Field. Kuwait's Burgan Field contains reserves of 72 billion barrels. Iraq's reserves, alone, are three times those of the United States. Moreover, promising areas for new discoveries are largely confined to Alaska and to off-shore areas where development is costly and uncertain.

Conventional wisdom believes that the less oil imported, the stronger the national security. But, conventional wisdom does not extend to agreement on measures for reducing that dependency, as the controversy over the exploration of Alaska's Arctic National Wildlife Refuge (ANWR) illustrates. Environmentalists argue that maintaining a pristine environment must take priority and that demand should be satisfied through conservation. Industry argues that conservation will be only a partial solution at best. Further, it advocates exploration on the basis that ANWR may contain the largest reserves in North America, can be developed without environmental damage, and will involve only a small portion of the Refuge. Congress, to date, has supported the environmentalists position.

Many petroleum controversies center on national energy security—an issue that is not new. In 1955, Congress gave President Eisenhower authority to control oil imports

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whenever the "nation's security or its economic well being was threatened". He chose not to use that power, but rather, he suggested purchasing and storing low-cost foreign oil in abandoned wells. To deal with national security concerns, the government now has stored approximately 580 million barrels of crude oil in underground caves; however, at present consumption levels, this amount is adequate to replace imports for less than three months.

"Our policy should be to conserve that which we have, rather than to take measures which would cause our supplies to be exhausted more rapidly."— Clarence Randall

In the late 1950s, Clarence Randall, then Chairman of the Council on Foreign Economic Policy, proposed that "Our policy should be to conserve that which we have, rather than to take measures which would cause our supplies to be exhausted more rapidly." In other words, use imports in the short term to build long-term security. Clarence Randall's philosophy still remains largely unresolved.

What are the implications of this oil situation on future US policy? We know with reasonable certainty that:

- Oil reserves are finite. The more domestic oil that is used in the near term, the less that will be available in the long term.
- Foreign sources have, and will continue to have, lower production costs. Maintaining a high level of domestic production in competition with low-cost foreign sources would require subsidies, protectionism, and high prices.
- Meeting United States environmental requirements is already more costly than in other oil-producing nations. The outlook is for higher costs, as the Environmental Protection Agency continues to take on an expansive character similar to that of the Nuclear Regulatory Commission.
- Domestic oil development is slow, costly, and uncertain. Overseas investment is increasingly attractive.
- Oil imports have already passed the point of no return. If there were a drastic reduction of oil imports the economy could not withstand the shock, even if the import percentage were substantially lower than it already is.
- Conservation may decrease oil consumption, thereby reducing the demand for new capacity. But realistically, it will not significantly affect the course of increasing import dependency.

In sum, limited production capability, high production costs, limited reserves, complex environmental issues, investors' choices, and conservation's practical limitations, make the increased use of imported oil a certainty. The real challenge is to be realistic—to concentrate on what we can do, and not on what we wish we could do. France, Germany, Japan, and other oil-dependent nations have learned to cope. The United States has no choice but to do likewise.

LICENSING AND THE FUTURE OF NUCLEAR POWER

Nuclear power provides nearly 21 percent of the United States' electrical power, but the industry is stalemated. A new plant has not been ordered for 15 years and a renewal of orders is not expected for another decade. Recently, however, new design concepts, environmental advantages, and a lack of alternatives has heightened interest in preserving the nuclear option.

Government action has focused on simplified licensing which is, vitally important. But, licensing is only one aspect of a complex problem. Other obstacles include: nuclear waste, siting, safety, investor confidence, and community acceptance. Without solutions to these, nuclear power will remain in the doldrums; an improved, but inactive, licensing process will be the result.

No practical alternative to nuclear power is available. Paul Tsongas, a former Massachusetts senator and a current Democratic presidential candidate, recently wrote:

> When I was struggling with the issue of nuclear power as a Congressman and Senator in the 1970s, there was furious debate among my staff members and outside advisors. The split saw my strong

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environmental supporters aligned with my political advisors. The argument was clear. Environmentalists were fiercely anti-nuclear. They were my most dedicated loyalists. And, they had valid concerns that were always being casually dismissed by utilities and governments alike. Being anti-nuclear would be substantively correct and politically beneficial.

On the other side was my energy staff person. He was not unsympathetic to the logic arrayed against him. He thought the nuclear industry and the utilities had been mindless, stubborn and reactionary. He thought that they had become their own worst enemy for good reason.

'But,' he asked, 'if you eliminate nuclear, what do you put in its stead? What exactly is the replacement process for shutting down the nuclear option? Tell me specifically, what substitutes for what?'

At first we provided the expected response about conservation and renewables option. But, when we tried to put numbers on them, there was a huge gap, no matter how aggressively we pushed these options.

That left oil, gas and coal. All were finite and oil and coal had particular problems if you overloaded the system with them. While gas would be a clean energy source it would not substitute for everything else. In the end, there were no open doors left except nuclear.

Accepting this was excruciating. Politically, it was all downside. It remains the most difficult and uncomfortable policy position I have ever taken. But today, more than a decade later, my position is unchanged.

In order for nuclear power to return, investors must be convinced standardization is real, performance claims associated with new concepts are achievable, and simplified licensing has proven workable. That requires construction and testing of plant prototypes. Before volume production is undertaken for any product line (for example, airplanes) prototypes test the concepts so that deficiencies can be corrected at minimum cost. Nuclear power plants require the same process; without prototypes, past mistakes will be repeated.

After the year 2000, the nuclear industry has a high probability of once again growing provided standardized models have been built and tested to form a solid foundation. The United States has a "window of opportunity" of approximately ten years. How and whether that "window" will be utilized is vital to the future of nuclear energy in this country.

CONSERVATION

Conservation is the most praised, most calculated, most ideological, most optimistic, and—with the possible exception of solar—the most popular alternative energy approach.

We do not know how much conservation has or will contribute. Accurately determining the savings due to conservation is difficult, as measuring how much energy we did not use and why is more subjective than objective. Moreover, savings may be exaggerated by regulatory agencies, such as the California Energy Commission, who can be biased by their own commitment to "success".

The forces currently driving conservation efforts include, for different reasons, ethics (opposition to waste), economics, ideology, environmentalism, opposition to growth, societal reshaping, political expediency, and business profit. The coalition of these interests has been very influential. But coalitions survive only when each member's gains from collective action exceed those obtainable individually. As time goes on, some interests will go their separate ways as ideology, economics, and quality of life conflict.

Regulators and utility managers have wisely turned conservation into an attractive business. Utilities currently spend over $2 billion per year on conservation in support of numerous programs, including free fluorescent lights, government-mandated energy efficiency standards, subsidies for exceeding standards, demand side management, and least-cost approaches. The utilities' conservation business is easily developed; the marketing is not difficult; and pricing and collections are simple, as well. Utilities are allowed to recover the costs of such programs, and make profits, much the same as they would for financing, building, and operating facilities.

Reductions in the annual growth rate of electrical power due to conservation have been estimated as high as four percent.

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That seems high, for when added to actual growth of four percent per year, it indicates total growth without conservation would have been eight percent. Such a rate has not been achieved for decades. More realistic estimates suggest a ten percent reduction in growth rate over the next decade. This is equivalent to saving one years' expansion in a decade—or equivalent to avoiding construction of twenty to thirty new generating plants. While this "avoidance" is significant, one must not lose sight of the fact that 180 to 270 new plants will still be needed in the remaining nine-year equivalent.

Petroleum savings due to conservation also are difficult to estimate. Gasoline prices, mandated automobile mileage standards, substitution of electrical energy (as in home heating), and many other variables all have an impact. Separating the influence of any one is not feasible.

SOLAR ENERGY: An Oversold Technology

The use of solar technology continues to improve for localized applications such as heating homes and swimming pools, and powering remote communication equipment. But solar's contribution to total energy generation is very small. Central generating stations are, and will remain, the major source of electrical power. Solar must demonstrate that it has practical applications in large, central stations if it is to make a significant contribution. That is unlikely. Nature, not technology, sets the limits. Peak sunshine is only four to eight hours, and every day is not sunny. Further, energy needs are greatest in the winter when the weather is poorest.

Storage systems (such as batteries or pumped hydro storage) can be used to compensate for conditions unsuitable for solar generation. However, the capacity of a solar generation system must then be large enough to meet current demand and charge the storage system simultaneously. This increased peak-load requirement means generating capacity must be two to three times that of a conventional plant. In addition, to compensate for losses in storage efficiency, approximately four units of energy must be generated for each three units supplied to the grid for storage. The combination of unpredictable weather, nighttime, and efficiency losses suggest 3,000 to 4,000 MWe of peak generation capacity, plus storage facilities, will be required to provide service equivalent to a 1,000 MWe conventional plant.

If a conventional plant of comparable size is required as a backup and can be justified economically, why add the solar investment?

Another alternative to assure continuity of service is a backup conventional plant of equal size. That is difficult to justify economically. If a conventional plant of comparable size is required, why add the solar investment?

Solar facilities are expensive and complex. Dixy Lee Ray, a prominent scientist, former University of Washington professor, former Chair of the Atomic Energy Commission, and former governor of the State of Washington, has this to say about a solar plant:

> To construct a 1,000 megawatt solar plant, the following amounts of material are needed: 35,000 tons of aluminum, two million tons of concrete (500 times more than for a nuclear plant), 7,500 tons of copper, 600,000 tons of steel, 75,000 tons of glass, and 1,500 tons of chromium and titanium.
>
> Whichever method is adopted, solar heat or photovoltaic, a large area of land is needed—about 50 square miles for a 1,000 megawatt plant. Compare this to 75 to 150 acres for a 1,000 megawatt nuclear or coal plant.

WIND ENERGY: Another Oversold Resource

Technical advancements particularly in variable-speed turbines, have resulted in some progress in wind energy. Nonetheless, like solar, wind is limited by nature and has been oversold to the public, thus presenting a special public relations problem.

As an example, Sweden oversold the potential renewable energy sources and is now confronted with the task of public backtracking. Over time, government policies gradually ruled out increased use of fossil fuels, new hydro power, and nuclear power. The new Swedish policies stressed reliance on conservation and renewables. The practical consequences of these policies were not evident until recently, since Sweden formerly had excess generating capacity.

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Difficult decisions had to be made following the government's proposal to close two of Sweden's twelve nuclear plants by the mid-1990s. This first step toward eliminating nuclear power raised real questions. Was the power from the two plants needed? (Answer: Yes) What should the replacement be? (Answer: Undetermined) Could conservation and renewables fill the need? (Answer: No) Should the previous decision be reversed and the two nuclear plants kept in operation? (Answer: Yes)

The previously established policy collapsed—as industry, labor, and many others expected. The two nuclear plants would continue to operate, and energy policy would be reexamined. It is no longer expected that the nuclear plants will be shutdown before the end of their useful life.

A windmill demonstration program much like the earlier one remains under discussion, but...the purpose now is to demonstrate to the public the limitations of windmills, rather than their potential.

Since wind energy had been prominently touted in Sweden as an alternative energy source, a major demonstration program for public education had been planned. However, this plan was reevaluated when a conservative government replaced the liberal government. A windmill demonstration program much like the earlier one remains under discussion, but with different priorities. The purpose now is to demonstrate to the public the limitations of windmills, rather than their potential.

COMPETITION IN ELECTRICAL POWER PRODUCTION

Perspectives on regulation of utilities has changed with time. Once considered comprehensive monopolies by necessity, a utility's scope included everything from generation to consumer distribution. Now the industry's components are examined, and each is recognized as having different competitive potential necessitating specific regulatory requirements. The four major components are: power generation and delivery to a grid; transmission to a distribution network; storage (such as pumped hydro) where applicable; and distribution to the ultimate users.

Each of these components has varying levels of competition and requires different levels of regulation. Power generation is becoming more competitive, as power is being provided by unregulated non-utility generators. Transmission systems remain largely regulated, but new approaches are being taken to encourage competition. Storage systems, normally part of a utility system, remain largely regulated, as does distribution to consumers.

The Public Utility Regulatory Policies Act (PURPA) was passed and required utilities both to buy from and sell to cogenerators, thus spawning a whole new industry. While legal limits remain on the types and capacities of plants, PURPA provided the beginning of a more competitive industry that will soon use all technologies. Estimates are that non-utility generation could account for one-quarter to one-third of new generation in the next ten years.

CONCLUSIONS AND POSITIONS

Desirable as it appears at the time, pursuit of ideals does not necessarily produce desirable results. For example, suppose the USA had achieved "energy independence", as was a national objective some years back. Oil, gas, uranium, and electricity would not be imported from Canada; low-cost oil would not be imported from the Middle East, Mexico, and South America; and coal use would be even more prolific.

How might the United States economy appear today as a self-sufficient energy nation? Oil would cost more than $50 per barrel, rather than around $20, and gasoline probably would be $3 to $4 per gallon. Domestic reserves likely would be depleted. Uranium would cost at least $30 per pound, and probably over $50, rather than $8 per pound. Natural gas prices likely would be several times current levels. High-cost producers of all energy sources would operate at the mercy of protectionist trade laws subject to change by government whim. Federal money would be pouring into "renewables" with few practical applications in sight. Total national expenditures for energy

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imports would be less, but would be more than offset by a loss of exports due to the high cost of manufactured goods and agricultural products. Investors would favor foreign investment more strongly.

Under today's conditions, there is little point in exerting the effort to be self-sufficient in oil production, or to even significantly lower imports. Nor is there any point in pursuing a major breakthrough with renewables. Reality means avoiding reliance on unproven theories, and instead, relying on proven technologies until the evidence supports change. Such evidence does not exist today.

Given this as my view, what positions would I propose relative to the issues under debate?

Arctic National Wildlife Refuge Exploration

The environmental objection is rather poorly founded—more ideological than rational. The proposed exploration area is a tiny fraction of the ANWR and companies are capable of making excellent restorations of properties. Environmental concerns should not present an insurmountable obstacle.

One disadvantage is that using the reserves now means that they will not be available to the United States in the future. On the other hand, that must be balanced against the short-term advantages: jobs will be created, the trade balance will be improved, and Alaskans will benefit economically. On balance, the advantages favor exploration, provided there is economic potential.

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Oil Storage

Increasing storage will improve national security. Inventory should be increased, and feasible means are available. One approach, for example, could charge an import fee of a dollar a barrel (about a 5 percent levy) and use that levy to purchase oil for storage. The income of approximately seven million dollars per day would allow purchase of approximately 125 million barrels per year. The oil inventory would double in approximately four years, and more than quadruple in ten years. In an emergency, the resulting two billion barrel inventory could replace a full year of imports.

Nuclear

Simplified licensing is essential, but licensing reform alone is insufficient to renew the nuclear program. A more complete program is needed, including demonstration plants and a publicly acceptable waste disposal program. The objective should be to establish a foundation by the year 2000 for the expansion of nuclear-generated energy, based on proven, standardized designs.

Renewables

Modest funding of research and development for renewables should continue. The program should include pilot plants of sufficient size to demonstrate both the merits and the limitations. The purpose must be to obtain objective facts based on actual experience.

Conservation

This should be pursued, but only to its economic limits. Planning for conservation should be based on proof of what is achievable, rather than on theory derived from ideology. Again, a primary objective should be to learn the limitations.

The federal government need not, and should not, become the source of funds to implement conservation methods. If the advantages are real, economics will drive conservation. The market should not be distorted by resorting to subsidies. Moreover, bottom-up initiatives as provided by local utilities and others will be far more effective than top-down initiatives from the federal government.

Environmental Policy

Acid rain, ozone depletion, and global warming each require specific responses tailored to specific conditions. The Clean Air Act, a possible case of overkill, may have

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to be relaxed. Although ozone depletion is not totally understood, it does appear to have sufficient scientific backing to justify the current corrective measures. Global warming lacks the scientific basis to justify drastic actions, even though it seems prudent to promote efforts to minimize carbon dioxide emissions. The government's go-slow approach to global warming is about right.

Competitive Power Production

New legislation should increase freedom of competition in electrical generation. The path pioneered by PURPA has opened the way, and this path should be expanded and remaining obstacles removed.

Conclusion

A review of the issues raises two basic questions:

- Assuming that Congress adopts all the ideas that it is considering (even if broadened as I propose) would the cumulative program merit the status of a "National Energy Strategy or Policy"? The answer is no. The ideas Congress has before it would not meet the requirements of a comprehensive policy—a concept that would harness, harmonize, and direct the nation's technical, social, political, and economic resources toward a defined national goal. The actions under consideration in the government are, in fact, the sum of individual reactions to individual problems (such as ANWR). At best, the current government thinking might be termed a limited tactical plan.
- Assuming a comprehensive government-designed national energy strategy were achievable and capable of being implemented, would the nation be better off with or without it? I am very skeptical of the benefits of such a national policy. A de facto national energy strategy evolved from free market interactions may not always produce everything everyone would like. But the alternative of an agency attempting to control (EPA-style) an issue as complex, far-reaching, and all-important as energy, could be disastrous.

The actions under consideration in the government are, in fact, the sum of individual reactions to individual problems. At best, the current government thinking might be termed a limited tactical plan.

Implementation of any government policy requires control, and thus necessitates (or at least produces) legislation, regulations, incentives, penalties, reporting, inspection, staffs, etc. A new bureaucratic organization would almost certainly result. The new agency (could it be called the Energy Supply and Utilization Agency?) might be as pervasive as the 17,000-employee Environmental Protection Agency; as relentless as the Nuclear Regulatory Commission; and as slanted by ideology as the California Energy Commission. Government programs mix politics with economics and usually favor the politics. The payoff for more politics is less economics, and thus, less energy.

Government solutions may sound appealing, that is until one remembers living with the consequences of past discrepancies between policy intentions and program results (remember "energy independence"). In fact, the lack of a comprehensive policy is not the disadvantage many consider it to be. I would be much more concerned if the government had a comprehensive policy with the intention to implement it. Then, government's main function would be to distort the free market via centralized planning and control. History has demonstrated that we must maintain the protection that only a free market system provides, since only it can make the much-needed ongoing adjustments to change.

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NUEXCO

REVIEW

1991 INDUSTRY DEVELOPMENTS

INTERNATIONAL

Major Nuclear Powers Agree to Apply Full-Scope Safeguards

France, the United Kingdom, South Africa, and the Soviet Union all announced in 1991 that they would apply International Atomic Energy Agency (IAEA) full-scope safeguards to all future contracts. However, customers of those countries with contracts negotiated prior to these announcements may be encouraged, but not required, to adhere to the safeguards. Over the last year and a half, Germany also has begun adhering to these safeguards, and Switzerland and Belgium are considering their application. Additionally, in August, China announced its intent to sign the Treaty for the Non-Proliferation of Nuclear Weapons (NPT). This makes it likely that China also will apply full-scope safeguards to its contracts.

China's action, in particular, increased pressure on North Korea, which had signed the NPT six years ago, yet still operated non-safeguarded facilities. Normally, safeguards agreements are ratified within two years of the signing of the NPT, but North Korea had not signed and ratified the specific agreements that would have allowed IAEA inspections of North Korean nuclear facilities. After months of negotiation, North and South Korea announced on December 30 that they intend to establish the Korean peninsula as a nuclear-weapons-free zone. On January 7, 1992, North Korea's ambassador to the IAEA announced that his country would sign the safeguards agreements before the end of the month.

The recent dissolution of the Soviet Union opens to question how and if its announced application of the safeguards will take place. A further question to be answered is which of the former Soviet republics will be included, and if they will proceed individually or separately.

Many Countries Lift Economic Sanctions Against South Africa

- On July 10, the United States lifted all its economic sanctions against South Africa, stating that the process of eliminating apartheid had been initiated and was irreversible. South African President F. W. de Klerk's request to Parliament in early 1991 to dismantle the last remaining legal foundations of discrimination was significant in this process.
- Japan lifted most trade sanctions in October, opening the way for Japanese companies to resume purchases of uranium from South Africa. Before 1988, when the sanctions went into effect, Japanese utilities were purchasing over ten percent of their uranium requirements from South African companies.
- Earlier in 1991, the European Community (EC) removed its sanctions, which apply to steel, iron, and gold coins. However, at that time, the EC maintained its support of UN sanctions applying to sporting events, arms, and crude oil.

IAEA Gains New Members

The IAEA accepted Yemen and the former Soviet republics of Lithuania, Latvia, and Estonia as members. These countries still must confirm their membership by depositing instruments of membership with the IAEA.

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AFRICA

South Africa's Uranium Production Drops Further; More Mines Close

South Africa's 1991 uranium production declined 33 percent from 1990, to 4.3 million pounds U_3O_8. With the closure of Buffelsfontein and ERGO during 1991, only four producers are currently operating: Hartebeestfontein, Palabora, Western Areas, and Vaal Reefs. Even Vaal Reefs has suspended production at its west plant. Despite most countries lifting their sanctions in 1991 against South African uranium, current market prices have precluded South African producers from regaining lost market share and volume.

Rössing Announces Further Cutbacks

Rössing Uranium Ltd. of Namibia announced in September that the company's Board had approved proposals to cut production to five million pounds U_3O_8 annually, from its previously reduced level of 6.5 million pounds. Rössing's production capacity exceeds ten million pounds U_3O_8 per year. Rössing has undertaken many cost-cutting measures in an effort to continue production through the depressed uranium market.

Uranium Production in Niger and Gabon Reduced

To reduce costs, Cogema of France has cut 20 percent of the work force of its subsidized Niger affiliates, SOMAIR and COMINAK. The company has also made cuts in COMUF, its Gabonese affiliate. Production from these three affiliates has been reduced to a level of 7.4 million pounds U_3O_8 per year, down approximately 25 percent from the level of recent years.

ASIA

Japan Progressing in Fuel Cycle Production and Reactor Technology

- In early October, co-operators Japan Nuclear Fuel Industries Co. and Japan Nuclear Fuel Services Co. opened Japan's first uranium enrichment facility near the village of Rokkasho. The facility has an initial capacity of 150,000 SWU per year. The site also has under construction a low-level nuclear waste burial site and a temporary storage facility. A reprocessing plant is planned as well. Residents of the Aomori Prefecture gave their implied approval of the site when they reelected the pro-nuclear governor early in February.
- On March 15, the Japan Atomic Energy Research Institute (JAERI) broke ground for a ¥80 billion (US$615 million) High Temperature Engineering Test Reactor at its Oarai Research Establishment. The reactor is scheduled to achieve criticality in 1995-1996.

The 30-GWt reactor will utilize specially fabricated uranium-dioxide (UO_2) fuel, mixed in various enrichments from 3 % to 10 % ^{235}U, and placed in a graphite reactor core. JAERI expects the primary coolant (helium) temperature to attain a maximum value of 950°C at the reactor exit, nearly triple the typical exit temperature of current light water reactors.

Japan Has Steady Growth in Nuclear Industry

Figures released by the Japan Atomic Industrial Forum late in 1991, covering FY 1990, showed a six-percent growth in industry spending, and a two-percent growth in mining and manufacturing revenues. Utility spending reached its second highest level ever in 1990, rising to ¥1.735 trillion (over US$13 billion), less than one-percent below the 1988 record. Mining and manufacturing sales rose to ¥1.768 trillion (US$13.6 billion).

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ASIA *(continued)*

Japan's New Reactor Plans and Start-Up

Japan announced plans to build as many as 40 new reactors over the next 20 years. These plans include two General Electric advanced boiling water reactors (BWR), the world's first such reactors. These advanced BWRs will be Tokyo Electric Power Company's units 6 and 7 at the Kashiwazaki-Kariwa station, and construction began in September. Also announced was the start of commercial operation of Hokkaido Electric Power Company's 550-MWe Tomari 2 reactor, which is Japan's forty-first reactor to reach commercial operation.

Reactor Incident Taints Japan's Growth Plan

On February 9, Kansai Electric Power Company's Mihama 2 470-MWe pressurized water reactor (PWR) suffered Japan's first necessary activation of an emergency core-cooling system. The rupture of a steam generator tube caused the incident. Although not that severe an incident by international standards, it was Japan's most severe incident during its nearly 30 years of nuclear power plant operation. An extensive study by the Ministry of International Trade and Industry (MITI) later determined that some anti-vibration bars installed during original construction were improperly placed or deformed. Despite no off-site implications and frequent and extensive steam generator tube inspections already required by MITI, a number of more stringent national policies have been instituted, as well as inspections of all similar reactors. Also in response to the incident, Kansai is creating a central laboratory specializing in nuclear plant safety.

Taiwan's AEC Conditionally Approves New Reactors

Taiwan's Atomic Energy Commission (AEC) has approved the Environmental Impact Assessment for Taiwan Power Company's (Taipower) plan for its seventh and eighth reactors. The AEC gave its approval based on Taipower's compliance with an extensive list of over 40 conditions.

China Announces Reactor Plans, First Start-Up

Early in 1991, Jiang Xinxiong, President of China National Nuclear Corporation, provided further details of China's nuclear power plans. The plans called for China to have six commercial nuclear power plants in operation by 1994, with a gross electrical output of at least 2,100 MW.

The original plan had three phases. The first included the start up of the domestically produced Qinshan 300-MWe PWR in 1991 and the Daya Bay 1 900-MWe reactor in 1992. Part of this phase was accomplished when the Qinshan reactor, China's first commercial nuclear power plant, achieved criticality on December 15. The second phase included a second, matching unit at Daya Bay by 1993, and at Qinshan, a matching 300-MWe unit plus two 600-MWe units by 1994. The third phase included an unspecified number of new plants by the year 2000 to raise nuclear-power-generated electricity to 6,000 MWe. Mr. Jiang also stated that China planned to increase total electrical generation from all sources to 810 billion kWh by 1996, up from the current level of 615 billion kWh.

However, since these plans were announced, the official start-up of Daya Bay 1 has been delayed until 1993. Although not yet official, it is likely the rest of the plan's announced schedule dates have slipped at least one year.

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ASIA *(continued)*

Korea Plans 13 More Reactors

Korea Electric Power Corporation announced in September that under the government's revised long-term development program, thirteen new commercial power reactors are planned for construction by 2006. These new reactors are in addition to the previously announced Wolsong 2 (680-MWe CANDU-type reactor) purchased from Atomic Energy of Canada Limited, and Uljin 3 and 4 (943-MWe pressurized water reactors) to be constructed with components supplied by ASEA Brown-Boveri/Combustion Engineering and General Electric Corporation. The thirteen additional reactors planned are five 700-MWe pressurized heavy-water reactors and eight 1,000-MWe PWRs.

India Discovers Its Largest Uranium Deposit

India's Department of Atomic Energy announced the discovery of a major uranium deposit at Domiasat, 140 kilometers south-west of Shillong, in the state of Meghalaya. The sandstone-type deposit covers an area of more than ten square kilometers, ranging in depth from approximately 5 to 50 meters. Ore grades reach as high as 0.41 % U_3O_8. The department states this is India's largest and richest known deposit.

India's AEC Plans Expansion of Nuclear Fuel Production, Plants, and Marketing

- India's Department of Atomic Energy announced it plans to invest over seven billion rupees (approximately US$270 million) in the next decade to build and expand its nuclear fuel production capability. Plans include increasing the UO_2 pellet production capacity at its Hyderabad uranium oxide fuel plant from 350 MT to 660 MT per year; building a uranium fuel assembly plant, also at Hyderabad; and commissioning a 150 MT-per-year zircaloy fabrication plant. The department also is planning to build a 300 MT-per-year zirconium sponge plant near Palayakayal in Tamil Nadu state.

  The government also allocated Rs900 million for the purchase of heavy water for its current and new reactors. The country can supply most, but not yet all, of its heavy water requirements from its plants in Baroda, Hazira, Kota, Manuguru, Nangal, Talcher, Thal, and Tuticorin.
- India has plans to market technology and products for nuclear power plants. The marketing effort is focusing on third-world countries since they do not require, and are least able to afford, sophisticated technology from the major industrialized nations. Egypt and Syria have already stated an interest in purchasing 5-MW research reactors. Details of all such transactions would be reported to the International Atomic Energy Agency.
- During 1991, India's Atomic Energy Commission selected Trikkareppur in the state of Kerala (on India's southwest coast) as the site for a proposed nuclear station. When completed, the station is expected to include eight 500-MWe (gross) units, making it the largest station in the country. Initial power generation from the first phase of four units is expected to occur in 1997. However, as the project is a cooperation between India and the former Soviet Union, plans and schedules are likely to change.
- India's eighth reactor, Narora 2, a 220-MWe pressurized heavy water reactor, achieved criticality late in 1991 and should enter commercial operation early in 1992.

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ASIA *(continued)*

Pakistan Signs Agreement With China for 300-MWe Plant

Announced in Beijing, China, on December 31 was the fact that the Pakistan Atomic Energy Commission has signed an agreement to purchase a nuclear power plant from China. A tentative agreement for the reactor purchase was first reached in 1989. The 300-MWe plant will be located in Chashma and should be in operation in 1998. Officials have stressed that the plant will be subject to IAEA safeguards.

AUSTRALIA

Uranium Mine Updates

- Western Mining Corporation and British Petroleum, owners of Australia's Olympic Dam project, announced in early 1991 that an eighteen-month, A$66-million expansion program was underway. The completed program will increase uranium production capacity by nearly sixteen percent, to 1,400 metric tons U_3O_8 per year (more than three million pounds) by mid-1992.
- Energy Resources of Australia, Ltd. (ERA) announced on November 4 a broad restructuring to be in full effect by 1992-1993. Uranium production will be decreased to a level in line with delivery commitments. Over 40 percent of the company's employees will be released as part of the restructuring.

Three-Mine Policy in Forefront of Uranium Mining Politics

Early in 1991, John Kerin, Australia's Federal Minister for Primary Industries and Energy, came out strongly for the abolition of the country's three-mine policy. Mr. Kerin's position was outlined in a submittal to the Australian Labor Party's (ALP) Uranium Review Committee. His letter described the three-mine policy as illogical, hampering development, and doing nothing to meet public concerns about the environment, health and safety, nonproliferation, and Aboriginal welfare.

The Uranium Review Committee subsequently determined that the three-mine policy was not in the best interest of the country and that the uranium industry should be expanded. However, at the behest of then-Prime Minister Robert Hawke, and contrary to the review committee's recommendations, the ALP voted during its biennial conference held in late June, to block any current expansion of Australia's uranium industry.

The new Prime Minister and head of the ALP, Paul Keating, is under pressure from the opposing National Party to reverse the three-mine policy. Also North Broken Hill Peko Ltd. (NBH) is attempting to persuade the federal government that the Jabiluka deposit and the existing Ranger mine should be considered a single entity, and that NBH thus should be allowed to develop Jabiluka within the constraints of the existing policy.

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EUROPE

Westinghouse, BNFL, and ENUSA Form New European Fuel Group

In an effort to optimize their investments in production and marketing, Westinghouse, British Nuclear Fuels Ltd. (BNFL), and Empresa Nacional del Uranio SA (ENUSA) recently formed the European Fuel Group (EFG). EFG has no personnel or headquarters, and required no monetary exchange for its formation. It is only a cooperative agreement among the three companies to pool their resources for the marketing, design, and manufacture of PWR fuel for the European market. Each company separately negotiates contracts but assigns the work to the appropriate member of EFG.

Westinghouse hopes to make gains in fuel manufacturing and related services after the dissolution of its agreement with ASEA Brown-Boveri. BNFL hopes to gain in markets for fuels using reprocessed materials, and ENUSA hopes to break into the European market for fuel fabrication.

Cogema to Close Uranium Division at La Crouzille by 1995

Cogema of France announced in the second quarter of the year that it will close mining operations at La Crouzille by 1995, citing that known reserves will only support another five years of production, and that mining costs exceed world market prices. The La Crouzille division, located in the Haute-Vienne region, has 10 mines with 600 employees, producing 40 percent of France's uranium production.

France Closes Chooz A After 24 Years of Operation

Due to high operating costs, Electricité de France (EdF) permanently shut down the Chooz A 305-MWe prototype pressurized water reactor on October 30. Chooz A was operated by EdF, and is owned by Société d'Energie Nucléaire Franco-Belge des Ardennes, a consortium formed by EdF and Belgian utilities.

France Opens Waste Site

ANDRA, France's national agency for the management of nuclear waste, officially opened its new FF1.2 billion Aube Storage Center for storage of low-level and medium-level wastes. The center has a capacity of one million cubic meters of short- and medium-term nuclear wastes. Plans call for the center to be filled by 2020 and have a design life of 300 years. The Aube Storage Center is intended to succeed the La Manche Storage Center which is already filled to its 0.5 million-cubic-meter capacity and will be closed and sealed in 1994.

German Utilities and EdF Continue Work on Inter-Investment Plans

In the first half of 1991, the German utilities of PreussenElektra (PREAG), Bayernwerk, and RWE Energie AG announced a proposal that would allow them to obtain an interest in Electricité de France (EdF). In return, EdF would gain a 15-percent interest in VEAG, the high-voltage distribution company for the former East Germany and the operator of the major brown coal power stations.

However, numerous political and legal issues have led to several revisions of the proposal. Political and labor groups in France strongly objected to German utilities gaining a share of EdF, France's national utility. After other proposals also were objected to, including one in which the German utilities would take a large ownership share of the new Civaux station, the most recent plan calls for the German utilities to gain a smaller share in the ownership of a number EdF power plants.

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REVIEW

EUROPE *(continued)*

(German Utilities continued)

In Germany, former East German municipalities are disputing the majority ownership of VEAG by the former West German utilities, and have, through a court appeal, delayed the purchase of VEAG by PREAG, RWE, and Bayernwerk. The latest proposal to allow EdF to invest in the German market calls for the three German utilities and EdF to form a production company to sell electricity to VEAG. Thus, VEAG would remain a German-owned company, as the remaining share of VEAG would be sold to former East German utilities, and not shared with EdF. The new German-French production company would actively market beyond German borders, throughout eastern Europe.

Germany to Close Its Only Nuclear Waste Site

Germany's only nuclear waste disposal facility, at Morsleben, will be closed following a decision by the Magdeburg District Court. The main basis of the court's decision was that Morsleben facility was being operated under a permit issued by the government of the former East Germany, and that permit was not automatically valid in the unified Germany, despite the Treaty of Unification that granted the facility a 10-year license as of July 1, 1990. Therefore, the court determined that the facility has no valid permit and must cease operations.

Germany Closes Down Last of Greifswald VVERs

The last operating unit of the four old-style (Model 230) Soviet-designed VVERs at the Greifswald station in eastern Germany was closed down near the beginning of 1991. The last unit, built in 1973, was closed because it could not meet the more stringent safety standards of the unified Germany. The other three Greifswald VVERs had already been shut down during 1990 for the same safety reasons; however closure of the last unit was delayed until completion of a substitute oil-powered generating station.

German Reactor Returns to Service After Legal Struggles

On August 21, Kernkraftwerk Obrigheim's 340-MWe (net) PWR reached full power after being shut down since May 1990 due to a legal challenge to its operating license. Opponents of the German reactor charged that the facility had been operating for over 20 years under a temporary license, and such a license did not allow operation over that length of time. A lower court concurred, but a federal court overruled that decision, stating the reactor's two partial operating licenses and eight regulatory appendices provided a legal basis for its continued operation.

Spain's ENUSA Begins Construction of Uranium Concentrates Plant

In early 1991, Empresa Nacional del Uranio SA (ENUSA), the Spanish nuclear fuel and fabrication company, began construction of a 950 ton-per-year uranium concentrates plant. The plant, which is scheduled for completion in three years, is located in the Salamanca province. Upon completion, it will be able to process all of Spain's requirements for uranium concentrates.

Spain's New Energy Plan to Continue Nuclear Moratorium

Spain's ruling Socialist party announced in mid-1991 that the country's new National Energy Plan will not permit the operation of any new nuclear plants before the year 2000, and instead, will depend upon natural gas to meet its growing electricity demand. Nuclear proponents had hoped the new energy plan would end the nuclear moratorium first imposed in 1984. With this announcement, utilities were again considering abandoning the incomplete reactors at Valdecabelleros and Lemoniz, rather than continuing their maintenance in a mothballed condition.

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EUROPE *(continued)*

Hungary Signs Deal to Use Soviet Fuel Cycle Services, Then Reconsiders

Hungary's state electricity utility, Magyar Villamos Müvek Tröszt (MVMT), reached an agreement in February with Atomenergoexport (AEE) of the Soviet Union for the purchase of fabricated fuel for use in Paks nuclear station's four VVER-440 units. A major factor, at that time, in the choice of AEE was that the Paks station's spent fuel would be taken by AEE for final disposal in the Soviet Union. The contract was to cover the entire operational life of the Paks units. MVMT sought competing Western offers, but no other offer contained a provision for the final disposal of spent fuel. Unlike prior fuel supply contracts with AEE, the contract required that AEE be paid in hard currency, not in transfer rubles, with payments negotiated annually.

In a separate contract in February, the Soviet Union agreed to purchase the yellowcake needed to produce the Paks fuel from the Mecsek mine at a price equivalent to world market prices.

Recent changes in the former Soviet Union and the high costs imposed by the Soviets, as well as a desire to establish more independence in fuel services, has led MVMT to alter its earlier position. MVMT decided at the end of 1991 not to send spent fuel back to the Soviet Union, and instead to develop domestic interim storage. In the near future, MVMT likely will request formal bids for methods to deal with its spent fuel.

Soviet Union Gives Up Ownership in Wismut Mines

On May 16, the Soviet and German governments signed an agreement whereby the Soviet Union gave up its 50-percent share of the Wismut uranium mines in Germany, in exchange for a release from any liability for the environmental cleanup of the mines.

Uranium Mines Close in Kazakhstan

Late in 1991, the Chalgi and Tassbulak uranium mines in Kazakhstan were closed, and production was further reduced at the open-pit mines on the Mangishlak peninsula. Many miners have left the company towns of the closed mines, and there are reports that much of the town supporting the Tassbulak mine is being dismantled. Some consideration is being given to the idea of converting one or more of the mines in Kazakhstan to an in-situ leach mining process.

Italian Firms Form Consortiums With Foreign Partners

- ABB Atom of Sweden, with Italy's Ansaldo S.p.A., and Fiat Componenti e Implanti (a Fiat subsidiary) formed a new consortium, Consorzio Pius. The consortium is to develop a design, based on ABB's PIUS light water reactor, that meets Italian licensing requirements, thereby positioning the new firm for a reconsideration of nuclear power by the Italian government. ABB owns 60 percent of Consorzio Pius; Ansaldo, 25 percent; and the Fiat subsidiary, the remaining 15 percent.
- Ansaldo agreed to create another consortium with Atomic Energy of Canada (AECL), that will complete Romania's Cernavoda 1 nuclear unit. The ultimate plan is for the Cernavoda station to have five units. AECL will supply the CANDU nuclear steam supply systems, while Ansaldo will be involved in the remainder of the plant. AECL and Ansaldo have a contract, worth approximately US$360 million, with Romania's nuclear utility, Regia Autonoma Nationala de Electricite (RENEL), for the reactor's completion.

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EUROPE *(continued)*

(Italian Consortiums continued)

The contract was conditional on RENEL's obtaining loans, arranged by the consortium, for funding the contract. On September 17, Canada's Export Development Corporation approved a loan to RENEL in the amount of C$315 million. Ansaldo agreed in the contract to obtain loans for the balance of the required funding.

Czechoslovakia Cuts Uranium Production

Now that the former Soviet Union has stopped its purchases of Czechoslovakian uranium, the Czech government has ordered a cut in uranium production. Even with these reductions, the country will be able to supply all its own nuclear fuel needs until at least 2005. The government will create a federal uranium reserve to accumulate excess domestic production, and will assess opportunities to sell uranium in the world market.

Czechoslovakia Updating VVERs and Receiving Bids for New Reactors

In January 1991, the Czechoslovakian government decided to continue operation at least through the end the year of the country's older Soviet-designed VVERs (Model 230), located at the Bohunice station, while some safety backfits were made. The entire backfit program will take two years and cost over US$100 million. The first backfits are for the improvement of emergency and fire-protection systems. If the backfit program is successful, the reactors may be approved for operation through 1995.

Early in 1991, a consortium of Czech enterprises, composed of Energoprojeckt, Ceske Energeticke Zavody, Slovenske Energeticke Podniky, Ceskoslovensky Uranovy Prumsyl Koncern, and a representative for the Czechoslovak Atomic Energy Commission requested bids for the design and construction of two 1,000 to 1,400 MWe nuclear power plants. The consortium's bid request asked for either PWR or BWR designs, and was receptive to alternative designs, including passively safe units. The second nuclear unit could be bid as an option. The initial requests were sent to ASEA Brown-Boveri, General Electric, Mitsubishi, Nuclear Power International, Westinghouse, and the Czech firm of Skoda.

Lithuania Concludes Agreement for Operation of Ignalina Station

The recently independent country of Lithuania reached an agreement in October with the Soviet Union's Ministry of Atomic Energy and Industry for the Ministry to continue its responsibility for the operation, safety, fuel, and equipment of the Ignalina station in Lithuania. The government of Lithuania formally took possession of the station August 27 and made the Lithuanian Ministry of Energy its new owner. However, the two Ignalina 1,380-MWe RMBKs (graphite-moderated, water-cooled reactors) will remain in the Soviet inventory under Soviet IAEA safeguards until Lithuania can complete the signing, ratifying, and enactment of the conditions in the Treaty on the Nonproliferation of Nuclear Weapons.

Lithuania to Get Assistance From Sweden in Creating Nuclear Agency

The Swedish Nuclear Power Inspectorate (SKI) will lead efforts to help Lithuania establish a nuclear regulatory agency and initiate an inspection program for its RBMK nuclear units. The program will include a probabilistic safety analysis, and a study of systems analysis, core physics, regulatory aspects, safety, and quality assurance. Lithuania, located not far from Sweden, has the world's two largest RBMK-type nuclear power plants, each rated at 1,380-MWe.

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EUROPE *(continued)*

Swiss Government Supports Capacity Increases for Nuclear Plants

In March, Swiss government officials announced their support of a plan to increase generating capacities of the country's nuclear power plants by at least 10 percent by the year 2000. Swiss utilities had proposed the capacity increases (ranging from 10 to 15 percent per unit) in May 1990, when substantial public opposition to construction of a sixth nuclear plant was apparent. On September 23, 1990, Swiss voters passed a referendum imposing a 10-year moratorium on all nuclear power plant licensing and construction. Therefore, in 1991, increasing unit capacities was the only option available to allow nuclear power to contribute to the nation's growth in generating capacity.

United Kingdom Reactor Updates

- In August, Scottish Nuclear's Hunterson B2 set a new record of 305 days of continuous operation by an advanced gas-cooled reactor. The previous record was just under 273 days. Later in 1991, Scottish Nuclear also completed its evaluation of the possibility of reopening Hunterson A. Uncertainties of near-term market conditions led the utility to end consideration of reopening the Magnox (graph moderated, gas-cooled) reactor, which was closed in 1990.
- Calder Hall 1, operated by British Nuclear Fuels Ltd., marked its thirty-fifth anniversary on October 17. The 50-MWe Magnox reactor was the world's first nuclear power plant built on an industrial scale.
- Construction on the United Kingdom's first pressurized water reactor (PWR), Sizewell B, is still ahead of schedule; it recently had its pressure vessel and containment dome installed.
- The Nuclear Installations Inspectorate of the United Kingdom has given Nuclear Electric approval to operate the Magnox reactors at Bradwell, Dungeness, Hinkley Point, and Sizewell to the end of their 30-year lifetimes in 1995. Prior to this announcement, the reactors had been given permission to operate only through the end of the year, until satisfactory results were obtained from reactor vessel embrittlement tests at Trawsfynydd.

NORTH AMERICA

Canadian Consortium Signs Cleanup Deal with Wismut

A consortium of Canadian firms signed an agreement in mid-1991 with Wismut AG, the former East German-Soviet mining company, to provide expertise and technology to clean up over 40 mines and tailings sites. Cost estimates for the cleanup range from US$7 billion to as high as US$20 billion, and may require 10-15 years to complete. Initial preparation and site analysis will begin in the fall of 1992.

Rio Algom Begins, Delays, Ends Merger With Uranium Resources

In late May, Rio Algom, Ltd. (RAL) and Uranium Resources, Inc. (URI) agreed to a merger in which Rio Algom Mining Corporation (which is owned by RAL) would acquire all outstanding URI shares. Rio Algom already had owned eight percent of URI. However, during third quarter 1991, the merger met an unexpected snag that postponed the deal. Both firms still supported the merger, but a Canadian tax issue arose that made the deal prohibitively expensive for Rio Algom. While there was hope to resolve this issue, on November 27 Rio Algom ended the merger agreement, citing the depressed uranium market. No comment was made regarding the effects of the tax law on the cancellation of the merger.

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NORTH AMERICA *(continued)*

Anti-Nuclear NDP Wins Elections in Saskatchewan

Continuing its success after winning elections in Ontario in September 1990, the New Democratic Party (NDP) emerged victorious in Saskatchewan's provincial elections on October 21, 1991. The NDP maintains a strong anti-nuclear platform and called for a moratorium on uranium production in Saskatchewan. Ironically, the NDP was last in power in Saskatchewan in the early 1980s and was instrumental in developing uranium mining in the province. While the Party now opposes nuclear power and uranium mining, its call for a moratorium is hedged by the provision that other employment must be found for the province's uranium miners before the moratorium is implemented.

Ontario Hydro Cancels, Revises Long-Term Uranium Contracts with Denison & Rio Algom

On April 29, Ontario Hydro notified Denison Mines, Ltd. that it would terminate its supply contract for over 3 million pounds of uranium per year, effective January 11,1993. Since Ontario Hydro is Denison's sole customer for its Elliot Lake production, and Denison subsequently stated its production costs at Elliot Lake are not competitive in the current world market, Denison has announced it will close Elliot Lake operations once deliveries to Ontario Hydro are completed in May 1992.

On June 17, 1991, Ontario Hydro's new chairman, Marc Eliesen, announced that, following negotiations with Ontario's New Democratic Party-controlled government, Ontario Hydro and Rio Algom had agreed to revise the termination date of Hydro's long-term contract with Rio. Under an economic obsolescence clause, the utility could have cancelled deliveries after 1993. However, deliveries now will continue through mid-1996 and the quantities will be increased. Hydro will still pay the original contract's above-market price for the 3.7 million pounds equivalent U_3O_8 to be delivered from now to mid-1993. The utility will pay a fee much closer to market price for an additional 5.9 million pounds above the original contract quantity. In addition, Ontario Hydro will provide a C$250-million contribution to the Elliot Lake economy.

Ontario Hydro Revises Long-Term Energy Plan

In response to the policies of Ontario's ruling New Democratic Party, Ontario Hydro announced in mid-December that it was dramatically revising its 25-year electric demand and supply plan. The revised plan will forego construction of any new generating plants in the foreseeable future, and instead, will rely upon independent power producers and demand-side management to meet reduced forecast load growth. This revision appears to scrap the original expansion program that called for ten new 880-MWe CANDU reactors by 2014.

Cameco Begins Privatization Process

In a long-awaited step, Cameco began its privatization process in June, with an initial public offering of 10.4 million shares of common stock. An offering later in the year boosted public ownership to 15.7 million shares, or over 30 percent of the company. The rest of the company is owned by the province of Saskatchewan (38.9%) and the Canadian government (30.8%).

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NORTH AMERICA *(continued)*

Canadian Government and Saskatchewan Government Form Joint-Review Panel

On April 18, the Canadian Federal Environmental Minister, Robert de Cotret, and the province of Saskatchewan's Environmental and Public Safety Minister, Grant Hodgins, announced the formation of a joint-review panel to "review the proposed uranium mining developments in northern Saskatchewan, and assess their acceptability." The review panel will "...focus on the environmental, health, safety, and socio-economic impacts of the proposed developments," and then report to the appropriate Ministers.

The panel was to have completed its final report on several proposed developments within 18 months. However, it took four months to name panel members, and they have moved very slowly thus far. As a result, Saskatchewan uranium producers are concerned that this panel may cause extended delays in the development process and create further uncertainty in the primary industry of the province.

Canadian Government to Remove Upgrading Requirements on Uranium

On December 13, Jake Epp, the Canadian Minister of Energy Mines and Resources, announced the government will be phasing out Canada's uranium upgrading policy. Similar to his announcement in 1990 interpreting the policy in light of the US-Canada Free-Trade Agreement, the new policy states that all new uranium sales contracts reviewed by the federal government after December 15, 1991, will not be subject to additional processing. Contracts signed before that date will still be subject to the policy, but contracted deliveries after December 31, 1995, will not be required to meet the policy, regardless of when the original contract was signed.

TENEX and CONCORD Form Joint Venture for Nuclear Fuel

CONCORD, a group of companies owned by Oren L. Benton, a Denver-based businessman, and v/o Techsnabexport (TENEX) of the Soviet Union, announced in June that they had formed a joint venture to market certain products and services of the Ministry of Atomic Energy and Industry (MAEI) of the Soviet Union, including all nuclear fuel products and services. The joint venture, called Global Nuclear Services and Supply, Ltd. (GNSS), has offices in Moscow, Zurich, and Washington, DC.

Energy Fuels Announces Joint Venture

On January 16, 1991, John Adams, Chairman of Energy Fuels, and Oren Benton, owner of NUEXCO, announced a joint venture involving all uranium operations of Energy Fuels. Energy Fuels, which was founded in 1972, has been the largest US uranium producer since 1986. The company holds over 20 million pounds of uranium reserves located in Mojave County, Arizona. The parties stated that the companies will remain separate participants in the nuclear fuel industry, cooperating where appropriate to strengthen each as a trading organization and as a producer.

Mr. Benton and the Adams family have equal interests in Energy Fuels' uranium operations. Mr. Adams and Mr. Benton serve as co-chairmen of Energy Fuels, with Mr. Adams continuing to direct its day-to-day operations. Mr. Benton was associated with Energy Fuels as Vice-Chairman prior to his purchase of NUEXCO.

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NORTH AMERICA *(continued)*

US Mining Changes

- On June 4, General Atomics (GA) based in San Diego, California, and Chevron Resources Company, a unit of Chevron Corporation of San Francisco, announced a definitive agreement whereby GA purchased all of Chevron's uranium assets in the USA and Canada. These assets included the Panna Maria uranium mill, a 55-percent share of the Rhode Ranch uranium mine in south Texas, the Mt. Taylor uranium mine in New Mexico (the largest known uranium deposit in the USA), and exploration properties in Saskatchewan, Canada.
- In the last quarter of the 1991, Power Resources Inc. (PRI) sold a 25-percent interest in its Gas Hills in-situ leach uranium project to UG Mining Inc., a US subsidiary of Urangesellschaft of Germany. The two companies then formed a joint venture to develop and manage the project, with production planned for 1997. PRI has estimated mineable reserves at Gas Hills, near Douglas, Wyoming, at about 20 million pounds U_3O_8.
- Pathfinder Mines, Inc. purchased Union Pacific Resources' Reno Creek in-situ leach (ISL) uranium property in northeast Wyoming. The purchase of this three-million pound reserve adds to Pathfinder's portfolio of properties in Wyoming that includes open-pit mines in the Gas Hills and Shirley Basin, and the Ruth and North Butte ISL properties.
- Total Minerals, operator of the Malapai/Total joint-venture uranium properties at Christensen Ranch, Wyoming, and El Mesquite, Texas, restarted those two projects on August 20. The ISL projects were restarted to establish production costs after a lengthy period of standby status. Production is being used to fulfill long-term contract commitments.

New-York LILCO Agreement Upheld in Highest NY Court

On October 22, the New York Court of Appeals, by a 4-3 decision, upheld the agreement between New York state and Long Island Lighting Co. (LILCO) that allowed LILCO to transfer ownership of the Shoreham nuclear power plant to the Long Island Power Authority (LIPA) for the sum of one dollar. The agreement also allowed LILCO to recover some of its $5 billion investment from ratepayers over an eleven-year period.

The 809-MWe (net) boiling water reactor was completed but never commercially operated due to public opposition. LILCO requested, but has not yet received, approval from the US Nuclear Regulatory Commission on a decommissioning plan, therefore LILCO, LIPA, and the New York Power Authority cannot yet proceed with full decommissioning efforts on the Shoreham Plant.

NRC Approves Rule for Reactor License Extension

On October 15, the Nuclear Regulatory Commission (NRC) unanimously approved new regulations for 20-year license extensions of US nuclear power plant. NRC Chairman, Ivan Selin, stated that the license extension process is "tough", as it requires the operating utility to submit the results of extensive technical analyses in support of its application to operate a reactor 20 years beyond its original 40-year license.

The new regulations do not require utilities to compile and submit documentation for the current licensing basis (CLB) for the plant. The CLB includes all NRC regulations, requirements, rules, and all utility commitments to the NRC over the operating life of the reactor. While the CLB

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NORTH AMERICA *(continued)*

(NRC Licensing continued)

would provide the NRC with useful additional information for considering the safety of the plant's operation in the extension period, it would require the utility to submit several thousand more documents, greatly increasing the cost of the application and the time necessary for review. Inclusion of the CLB in the application also might open a plant's current operation to intervenor actions. The license renewal review process allows for public comment, but only on issues relating to operation of a plant during the 20-year extension period, not on issues concerning its current 40-year license.

US Nuclear Utilities Pool $50 Million for Advanced LWR Development

The US nuclear industry announced in November that it has secured more than 90 percent of the utilities' commitment toward its $50-million share of funding for development of first-of-a-kind (prototype) engineering in the Advanced Light Water Reactor Program. Nuclear equipment vendors will contribute another $50 million after the first year of the program. These contributions by the US commercial nuclear power industry match the US Department of Energy's planned five-year infusion of $100 million into the engineering portion of the program.

DOE Awards NPR Construction Management Contracts, Then Drastically Reduces Size of Program

In the first quarter of 1991, the US Department of Energy (DOE) awarded two construction management contracts (each worth up to $4 million) for the first US New Production Reactor (NPR). Winners of the contracts were Bechtel National Inc., for a 2,500 MWt heavy water reactor (HWR) at the Savannah River site, and Fluor Daniel, for a 1,840 MWt modular high-temperature, gas-cooled reactor (MHTGR) at the Idaho National Engineering Laboratory. DOE expected to choose by December 27 which technology it would pursue to the completion of a demonstration plant.

However, the end of the Cold War has dramatically reduced strategic requirements for tritium. On December 16, Secretary of Energy James Watkins announced that funding for the NPR program had been cut by $145 million (about 28 percent) and that the two design teams (Ebasco and Cega) would have their budgets cut by 80 percent to help meet the new funding level. He also stated that the HWR and MHTGR designs are to be reduced in size to one-third or one-fourth of their original size. The impact of the funding cuts on the management contracts has not yet been announced.

Sequoyah Fuels Ordered Not to Restart Uranium Conversion Plant

On October 4, the Nuclear Regulatory Commission (NRC) issued an order to Sequoyah Fuels Corporation (SFC) prohibiting the restart of its Gore, Oklahoma uranium conversion plant. The facility will not be allowed to reopen until a plan to improve the plant's health and safety program, as well as its environmental program, is submitted to and approved by the NRC. SFC had shut the plant for a two-week routine maintenance period when the NRC issued the order. As of the year-end, SFC had made extensive improvements in the plant's operation and programs, but had not yet received approval to restart it.

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NORTH AMERICA *(continued)*

US Nuclear Power Plants

• On July 24, GPU Nuclear Corporation's 808-MWe Three Mile Island 1 (TMI 1) unit established a record of 480 days of continuous operation for a light water reactor, surpassing the standing record of 477 days. Then, on August 30, Pacific Gas & Electric's Diablo Canyon 2 1,087-MWe PWR broke that operation record by running continuously for 481 days. Diablo Canyon 2 had only held the honor for a few days when Kansas Gas & Electric's Wolf Creek 1,135-MWe PWR surpassed both records to set the record of 487 days of continuous operation, before shutting down for scheduled maintenance.

• Two US reactors surpassed the 100-billion kWh lifetime generation mark: Duke Power's 846-MWe Oconee 1 unit reached the achievement at 10:39 a.m. on July 28, and the following day, American Electric Power Company's 1,202-MWe Cook 1 unit also reached the mark. Only reactors in Germany and Belgium had previously attained that mark.

• Tennessee Valley Authority's (TVA) Browns Ferry Unit 2 reached full power in mid-August after several months of testing. The 1,065-MWe BWR had been shut down since March 1985 due to safety concerns at all three Browns Ferry units. Since that time, TVA has spent over $1.2 billion for improvement at the site to address those safety concerns.

• The 31-year old Rowe, Massachusetts, nuclear plant owned by Yankee Atomic Electric Company was shut down voluntarily by the operators on October 1, in response to an NRC staff recommendation. The staff recommended that the 167-MWe PWR be shut down pending additional analysis of the plant's response to certain accident scenarios. The NRC is most concerned about the reactor's ability to withstand pressurized thermal shock from the sudden rush of cold water introduced in an emergency cooling situation. Yankee decided to keep the unit shut down through its planned refueling in April 1992, rather than petition the NRC to allow it to resume operations at the plant before the scheduled refueling. Yankee has been using the time to gather data on the embrittlement level of the pressure vessel, in hopes of satisfying the NRC's concerns about the safety of the oldest operational US commercial reactor. Yankee intends to present a substantial case to the NRC so that the Rowe unit is allowed to operate until the expiration of its license in 2000, and possibly to receive a license extension for operation until the year 2020. The embrittlement situation at the Rowe unit, and the handling of the issues by the utility and the NRC is perceived as a test case for the future operation and license extension applications of many older US reactors.

• On December 26, Public Service Company of Colorado (PSC) started moving spent fuel from its closed Fort St. Vrain gas-cooled reactor into its $17-million on-site modular vault dry storage system (MVDS). PSC has a 1965 contract in which DOE is required to accept the plant's spent fuel. DOE's acceptance of the spent fuel is due to the fact that the plant was formerly a one-of-a-kind demonstration plant of the US Atomic Energy Commission (predecessor to the DOE).

The spent fuel was to be moved to storage at the Idaho National Engineering Laboratory (INEL), but Idaho's government has objected in court to the shipments on a number of environmental and safety grounds. INEL already stores a substantial amount of spent fuel, but Idaho is becoming increasingly concerned that, with the delays in DOE's storage programs, INEL is being used as a "dumping ground", and a *de facto* storage center. Idaho is trying to pressure

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NORTH AMERICA *(continued)*

(US Nuclear Plants continued)

DOE to meet its interim storage requirements by using other methods in other locations. PSC has been caught in the middle of this struggle and finally decided, following further court rulings sustaining Idaho's objections, that it would move the fuel to the storage center rather than allow it to remain in the reactor core. PSC had resisted this initial move because the introduction of nuclear material into the MVDS means that the facility will require decommissioning, at a cost of about $1.5 million. However, as maintenance costs are reduced by about one million dollars per month when the fuel is in the MVDS, and since PSC expects further legal delays, the move became worthwhile. Also, PSC plans to convert the Fort St. Vrain facility to natural gas by 1998, and to meet that deadline, PSC needed to remove the fuel from the reactor core as one of the initial steps in the $350 million decommissioning program.

LES Files Application for US Enrichment Plant

Louisiana Energy Services (LES) filed an application with the NRC on January 31, 1991, for a license to construct and operate a uranium enrichment plant. The NRC may take up to two years to consider the application. If approved, the LES plant will be the first privately owned enrichment plant in the USA. Construction on the facility is planned to begin in early 1993, assuming timely NRC approval of the license. Concurrently, LES stepped up its efforts to gain financial commitments for construction and also increased its efforts to market the plant's potential production.

Anti-Dumping Petition Filed Against Former Soviet Union

On November 8, 1991, the Oil, Chemical, and Atomic Energy Workers Union and certain uranium producers with US production filed a petition with the US Department of Commerce and the US International Trade Commission (ITC) charging that uranium was being dumped in the United States by the Soviet Union and the individual republics that were part of the former USSR. The petition claimed that Soviet trade practices were causing injury and threatening further injury to the US uranium industry.

On December 3, 1991, the staff of the ITC held a public conference to investigate the petition. The purpose of the ITC investigation is to determine if injury to the domestic uranium industry has been caused by the Soviet imports. ITC procedure allowed the petitioners and the opposition each an hour at the conference to state their case. Only ITC staff were present to hear the testimony; they were allowed to interrupt with questions, but there was no cross-examination. After hearing the testimony and receiving briefs from each party elaborating their respective positions, the ITC staff assembled and analyzed the issues for the commissioners assigned to the case, who then made a preliminary determination whether to dismiss the petition or continue the investigation.

On December 18, the ITC commissioners made a preliminary decision that the issues merited further investigation. The procedure now is continued by the International Trade Administration of the Department of Commerce, which has 160 days to ascertain if, in fact, the Soviet uranium marketed in the USA was sold at less than fair market value.

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SOUTH AMERICA

Argentina and Brazil Sign Non-Proliferation Accord

At a meeting of Latin American leaders in Guadalajara, Mexico on July 18-19, the presidents of Argentina and Brazil signed an accord outlining their mutual agreement on the peaceful uses of nuclear energy. The treaty outlines specific measuring systems for the accounting of nuclear-related material. On December 13 in Vienna, Austria, the presidents also signed draft safeguards agreements with the International Atomic Energy Agency (IAEA) confirming the intention of their earlier accord. Their agreement with the IAEA is compatible with the Treaty for the Prohibition of Nuclear Weapons in Latin American (Tlatelolco Treaty) and likely will lead to the implementation of full IAEA non-proliferation safeguards.

Uruguay's Plans for 600-MWe CANDU Reactor on Hold

Until other energy alternatives can be examined, the government of Uruguay put on indefinite hold its plan for an Atomic Energy of Canada, Ltd. (AECL) 600-MWe CANDU-type pressurized, heavy-water reactor. The government indicated that the availability of new energy alternatives had significantly altered its situation after discussions were initiated with AECL. The alternatives include Paraguay's offer to sell Uruguay electricity, and a discussion by Brazil and Argentina to construct a natural gas pipeline that could give Uruguay access to a supply of natural gas.

Uruguay's three million people depend on hydroelectric power for nearly 75 percent of their electricity requirements, but recent droughts have severely hampered normal levels of electrical generation. A plan for a 600-MWe nuclear power plant had been initiated with AECL, with Uruguay planning to export excess electricity to Brazil and Argentina.

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NUCLEAR INDUSTRY CALENDAR

1992

Feb. 23-25 ***INFO Centers Workshop*** (Marriott Hotel, Palm Beach Gardens, Florida).
Sponsored by the U. S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

March 22-25 ***Fuel Cycle Conference '92*** (OMNI Charleston Hotel, Charleston, South Carolina).
Sponsored by the U. S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

April 8-10 ***Research and Development in the Nuclear Industry*** (Peterhouse, University of Cambridge, England).
Sponsored by the Institution of Nuclear Engineers and the British Nuclear Forum.
Contact: Ms. Ipek Yigit, Manager for Public and Industrial Affairs, British Nuclear Forum; phone: 071-828-0116; Fax: 071-828-0110; Address: 22 Buckingham Gate, London, SW1E 6LB, England.

April 8-10 ***25th Japan Atomic Industrial Forum Conference*** (Pacifico Yokohama, Yokohama, Japan).
Contact: Department of Planning and International Affairs, Japan Atomic Industrial Forum, Inc.; 81-3-3508-2411; Fax: 81-3-3508-2094; Address: 1-1-13 Shimbashi, Minato-ku, Tokyo 105, Japan.

April 12-16 ***8th Pacific Basin Conference*** (Taipei, Taiwan).
Sponsored by the Amercian Nuclear Society.
Contact. ANS Meetings Department; 708-352-6611.

April 26-28 ***INFO '92 Conference*** (OMNI Charlotte Hotel, Charlotte, North Carolina).
Sponsored by the U. S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

May 5-7 ***Annual Meeting on Nuclear Technology '92*** (City Conference Hall, Karlsruhe, Germany).
Sponsored by the German Nuclear Society and the German Atomic Forum.
Contact: Congress Office JK'92; INFORUM GmbH, Heussallee 10, W-5300 Bonn 1; Phone: 0228-507-223.

May 15-17 ***19th Annual Meeting & Int'l Conference on Nuclear Energy*** (Hotel Diplomat, Prague, Czech.).
Sponsored by World Nuclear Fuel Market.
Contact: Donna Cason; 404-447-1144; Fax: 404-447-1797.

Sept. 20-23 ***International Uranium Seminar '92*** (Hyatt Regency Hotel, Lake Tahoe, Nevada).
Sponsored by the U. S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

Sept. 21-23 ***Second International Conference on Training for Operation & Maintenance in the Nuclear Industry*** (The Moat House International Hotel, Stratford-upon-Avon, United Kingdom).
Sponsored by the Institution of Nuclear Engineers.
Contact: INE Conference Secretary; 081-698-1500 or 081-698-4750; Fax: 018-695-6409.

Nov. 15-18 ***Nuclear Energy Forum*** (Fairmont Hotel, Chicago, Illinois).
Sponsored by the U. S. Council for Energy Awareness.
Contact: USCEA Conference Office; 202-293-0770; Telex: 7108249602; Fax: 202-785-4113.

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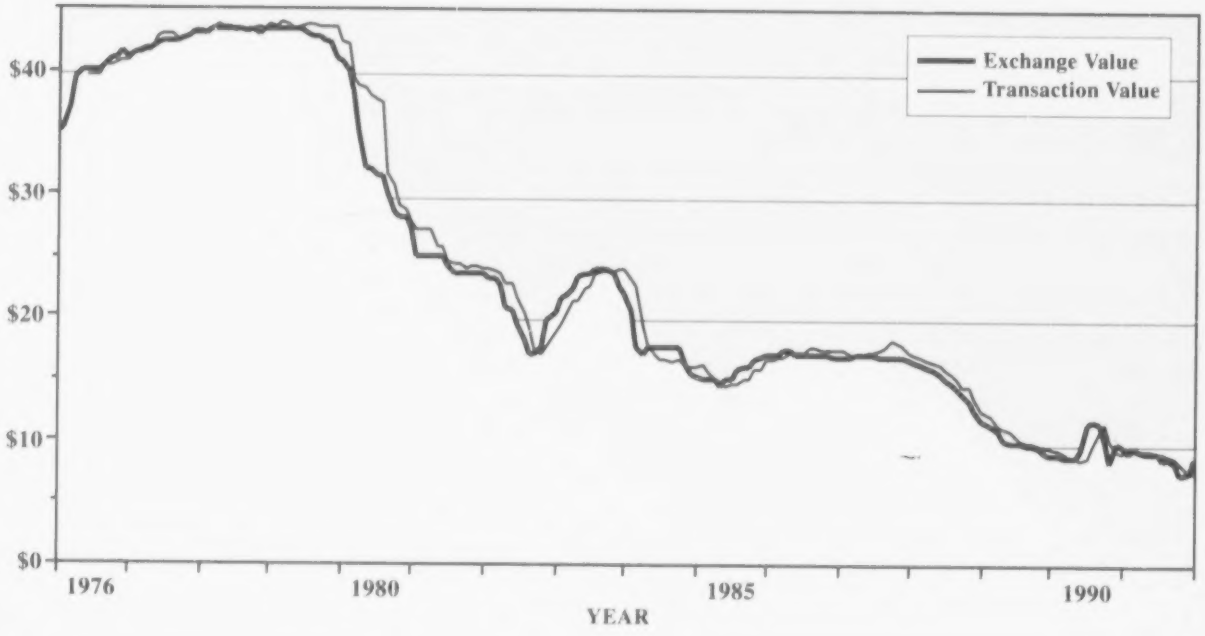
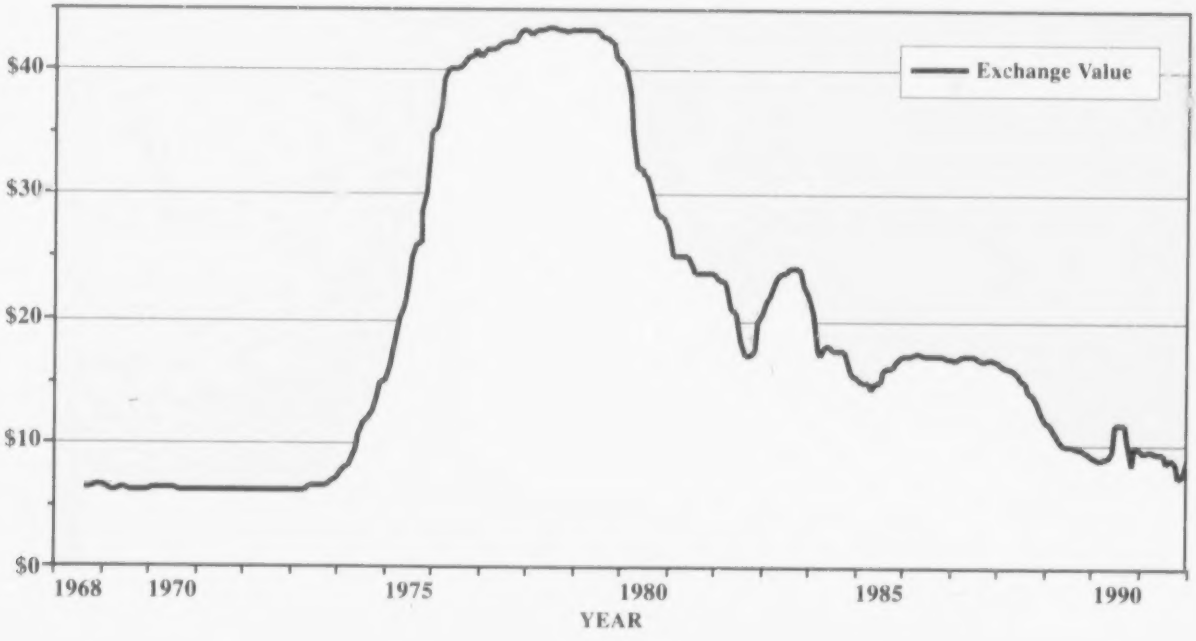
NUEXCO

NUEXCO HISTORICAL EXCHANGE VALUE AND TRANSACTION VALUE

(in US dollars per pound U_3O_8)





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HISTORICAL MARKET VALUES

Exchange Values

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1968	—	—	—	—	—	—	—	6.35	6.35	6.40	6.45	6.50
1969	—	6.35	6.10	6.10	6.25	6.25	6.20	6.20	6.15	6.15	6.15	6.20
1970	6.30	6.30	6.30	6.30	6.30	6.30	6.30	6.20	6.15	6.15	6.15	6.15
1971	6.20	6.20	6.20	6.20	6.15	6.05	6.00	5.95	5.95	5.95	5.95	5.95
1972	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95	5.95
1973	5.95	6.00	6.10	6.20	6.45	6.50	6.50	6.50	6.50	6.50	6.75	7.00
1974	7.70	7.90	8.00	9.00	9.50	10.50	11.50	12.00	12.50	14.00	14.75	15.00
1975	16.00	16.00	18.00	20.00	21.00	23.00	24.70	26.00	26.00	28.50	30.00	35.00
1976	35.20	37.00	39.25	40.00	40.00	40.00	40.00	40.40	41.00	41.00	41.50	41.00
1977	41.35	41.50	41.60	41.60	42.00	42.25	42.25	42.25	42.40	42.75	43.20	43.20
1978	42.90	43.25	43.25	43.25	43.40	43.40	43.40	43.10	43.25	43.00	43.25	43.25
1979	43.25	43.25	43.25	43.25	43.25	43.00	42.70	42.70	42.20	42.20	41.00	40.75
1980	40.00	38.00	35.00	32.00	32.00	31.50	31.50	30.00	28.50	28.00	28.00	27.00
1981	25.00	25.00	25.00	25.00	25.00	24.25	23.50	23.50	23.50	23.50	23.50	23.50
1982	23.00	23.00	22.50	20.75	20.50	19.25	18.25	17.00	17.00	17.50	19.75	20.25
1983	21.50	21.75	22.25	23.25	23.50	23.50	24.00	24.00	24.00	23.50	22.50	22.00
1984	20.50	17.50	17.00	17.75	17.75	17.50	17.50	17.50	17.50	16.00	15.50	15.25
1985	15.00	15.00	15.00	14.25	15.00	15.00	15.75	16.00	16.00	16.50	16.75	17.00
1986	17.00	17.00	17.25	17.25	17.00	17.00	17.00	17.00	17.00	17.00	16.75	16.75
1987	16.65	16.75	17.00	17.00	17.00	16.90	16.75	16.65	16.65	16.75	16.65	16.55
1988	16.30	16.15	15.90	15.75	15.40	15.10	14.75	14.15	13.75	13.15	12.50	11.75
1989	11.60	11.20	10.70	10.10	9.85	9.80	9.80	9.70	9.60	9.40	9.20	9.00
1990	8.85	8.70	8.80	8.80	9.25	11.60	11.70	11.45	10.10	8.35	9.80	9.70
1991	9.10	9.50	9.30	9.10	9.20	9.05	8.55	8.75	8.40	7.25	7.40	**8.75**

US Premium (Relative to the Exchange Value)

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1986	—	—	—	—	—	—	—	—	—	—	0.65	0.75
1987	0.85	1.00	1.50	1.50	0.90	0.60	2.50	2.35	2.10	1.65	0.85	0.65
1988	0.70	0.50	0.15	0.25	0.60	0.00	0.00	0.00	0.00	0.00	**Discontinued**	

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HISTORICAL MARKET DATA

UF_6 Values

Year	Determined as of the last day of the month indicated ($US/kg U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1985	—	—	—	40.50	42.50	42.50	44.00	44.50	44.50	46.00	46.00	47.00
1986	47.00	48.00	48.00	48.50	48.25	48.25	48.25	48.00	48.00	48.00	48.00	47.75
1987	47.75	48.00	48.00	48.00	47.75	47.75	47.50	47.00	46.75	47.00	47.00	47.00
1988	46.50	46.00	45.50	45.25	44.75	44.00	42.75	41.00	40.75	39.00	37.50	35.50
1989	34.75	34.00	33.00	30.50	30.25	30.25	30.00	29.75	29.75	28.25	27.75	26.50
1990	25.90	25.25	24.40	24.40	25.50	32.00	32.50	32.25	29.50	24.75	28.75	28.75
1991	27.50	27.75	27.50	27.25	27.60	27.25	25.75	26.25	25.50	22.75	22.75	**26.00**

US Premium (Relative to the UF_6 Value)

Year	Determined as of the last day of the month indicated ($US/kg U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1986	—	—	—	—	—	—	—	—	—	—	2.50	2.50
1987	2.50	2.50	3.50	3.00	2.25	1.75	6.50	6.00	4.25	3.10	2.25	2.00
1988	1.25	1.25	0.50	0.50	1.00	0.00	0.00	0.00	0.00	0.00	**Discontinued**	

Conversion Values

Year	Determined as of the last day of the month indicated ($US/lb U as UF_6)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1981	1.20	1.20	1.20	1.40	1.15	1.15	1.15	1.10	1.10	1.10	1.20	1.20
1982	1.20	1.20	1.20	1.20	1.00	1.00	1.00	0.90	1.10	1.60	1.45	1.45
1983	1.20	1.40	1.40	1.20	1.20	1.20	1.10	1.10	1.00	0.60	0.60	0.60
1984	0.60	0.30	0.80	0.80	0.80	0.00	0.00	0.80	1.00	1.00	0.80	0.80
1985	1.00	1.00	1.00	1.50	1.50	1.60	1.60	1.60	1.60	1.60	1.60	1.60
1986	1.60	1.80	1.90	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.80	1.80
1987	1.80	1.80	1.80	1.80	1.80	1.80	1.90	1.90	1.90	1.90	1.90	1.90
1988	1.90	1.80	1.80	1.80	1.80	1.80	1.85	1.95	1.95	1.95	1.95	1.95
1989	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.90	1.90	1.80	1.75	1.65
1990	1.50	1.50	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45	1.45
1991	1.45	1.45	1.45	1.45	1.50	1.50	1.50	1.60	1.55	1.55	1.55	**1.55**

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Transaction Values

Year	Determined as of the last day of the month indicated ($US/lb U_3O_8)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1976	—	—	—	—	39.60	39.70	39.70	40.40	40.30	40.60	40.70	40.70
1977	41.30	41.30	41.40	41.50	42.80	42.90	43.00	42.60	42.50	42.80	42.90	42.90
1978	43.10	43.30	43.70	43.60	43.60	43.20	43.30	43.40	43.40	43.60	43.40	43.70
1979	43.60	43.80	43.70	43.40	43.60	43.70	43.70	43.60	43.60	43.60	43.50	42.30
1980	42.00	39.30	38.60	38.40	37.90	37.60	37.30	31.60	30.60	29.00	28.70	27.70
1981	27.20	27.20	27.00	25.70	25.70	24.50	24.40	24.30	23.90	24.10	24.10	24.00
1982	24.00	23.70	23.40	22.60	22.70	21.50	20.30	19.10	17.30	17.00	17.55	18.80
1983	19.35	20.00	21.35	21.40	22.35	22.45	23.50	23.60	23.65	23.65	23.85	23.85
1984	23.05	22.50	19.25	17.90	17.00	16.50	16.60	16.40	16.55	16.05	15.90	15.90
1985	16.20	15.70	15.05	14.90	14.45	14.60	14.75	15.10	15.10	15.75	15.80	16.55
1986	16.55	16.70	16.70	17.10	17.15	17.20	17.50	17.45	17.35	17.25	17.30	17.35
1987	17.35	16.90	16.95	17.00	17.20	17.10	17.30	17.55	18.20	18.05	17.80	17.20
1988	16.85	16.65	16.55	16.45	16.10	15.80	15.45	15.00	14.50	14.40	13.30	12.50
1989	12.25	12.00	11.25	11.00	10.75	10.45	9.95	9.80	9.80	9.65	9.55	9.40
1990	9.25	9.05	8.75	8.65	8.55	8.80	9.75	10.80	11.40	10.10	9.30	9.15
1991	9.40	9.45	9.35	9.30	9.30	9.20	9.15	8.95	8.70	8.35	7.45	**7.50**

SWU Values

Year	Determined as of the last day of the month indicated ($US per SWU)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1986	80	80	80	80	75	78	78	78	78	78	80	80
1987	80	80	77	77	75	73	75	75	73	69	73	73
1988	73	73	70	68	68	68	68	65	65	65	65	65
1989	65	67	67	67	66	66	66	65	63	59	57	54
1990	54	50	50	50	50	50	50	50	50	51	51	51
1991	51	50	52	52	54	59	66	67	67	68	68	**70**

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HISTORICAL MARKET DATA

Loan Rates

Year	Determined as of the last day of the month indicated (Percent per Annum)											
	Jan	**Feb**	**March**	**April**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**
1968	—	—	—	—	—	—	—	4.00	4.00	4.00	4.00	4.00
1969	4.00	4.00	5.00	5.00	5.00	5.00	5.00	5.00	6.00	6.00	6.00	6.00
1970	6.00	6.20	6.40	6.50	6.50	6.50	6.50	5.00	6.50	6.00	5.50	5.50
1971	5.00	4.75	4.75	4.75	5.00	5.25	5.25	5.25	5.25	5.25	4.50	4.50
1972	4.00	4.00	4.00	4.50	4.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00
1973	5.50	5.50	5.75	5.75	6.00	6.25	7.00	7.00	7.00	7.00	7.50	8.00
1974	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
1975	8.00	7.00	7.00	7.00	7.00	6.50	6.50	6.50	6.50	6.50	6.50	6.50
1976	6.50	6.50	6.50	6.50	*	*	*	*	*	*	*	*
1977	*	*	*	*	6.50	6.50	6.50	6.75	7.25	7.25	7.25	7.25
1978	7.25	7.00	7.00	7.00	7.00	7.50	7.75	7.75	7.75	7.00	7.00	7.00
1979	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1980	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
1981	7.00	7.00	7.00	7.00	7.00	5.50	5.50	5.50	5.50	6.00	6.00	6.00
1982	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1983	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1984	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
1985	6.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
1986	5.00	5.00	5.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
1987	3.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	4.00	4.00	3.50	3.50
1988	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1989	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1990	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
1991	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	**3.00**

* Float with Prime Rate

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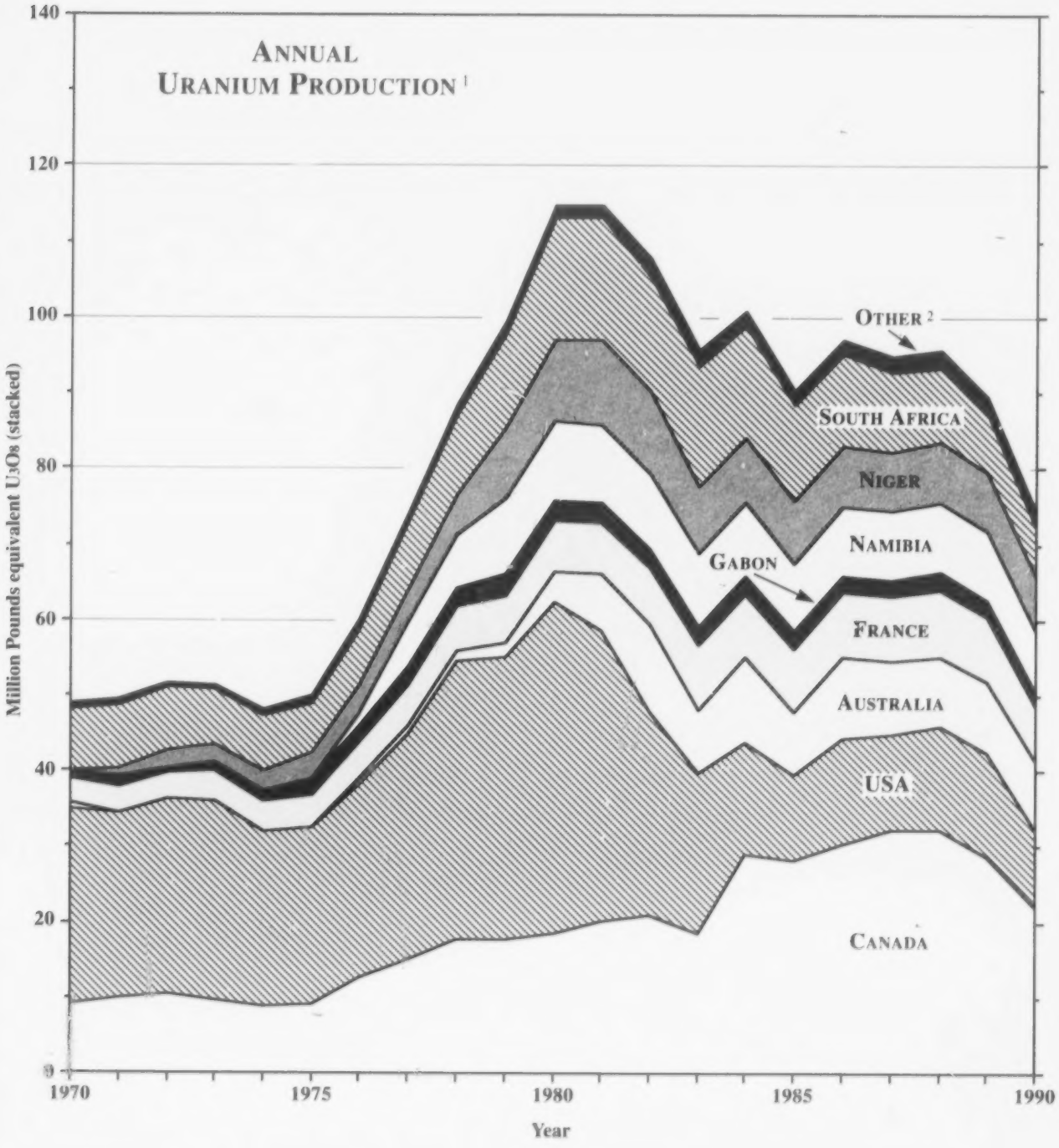

[1] Estimated world uranium production in 1990 totalled 74.5 million pounds equivalent U_3O_8 —
(Australia: 9.1 – Canada: 22.0 – France: 7.4 – Gabon: 1.8 – Namibia: 8.0 – Niger: 7.4 – South Africa: 6.4 – USA: 10.2 – Other[2]: 2.2)

[2] **Other** includes: Argentina, Belgium, Brazil, India, Pakistan, Portugal, Spain, western Germany, and Yugoslavia

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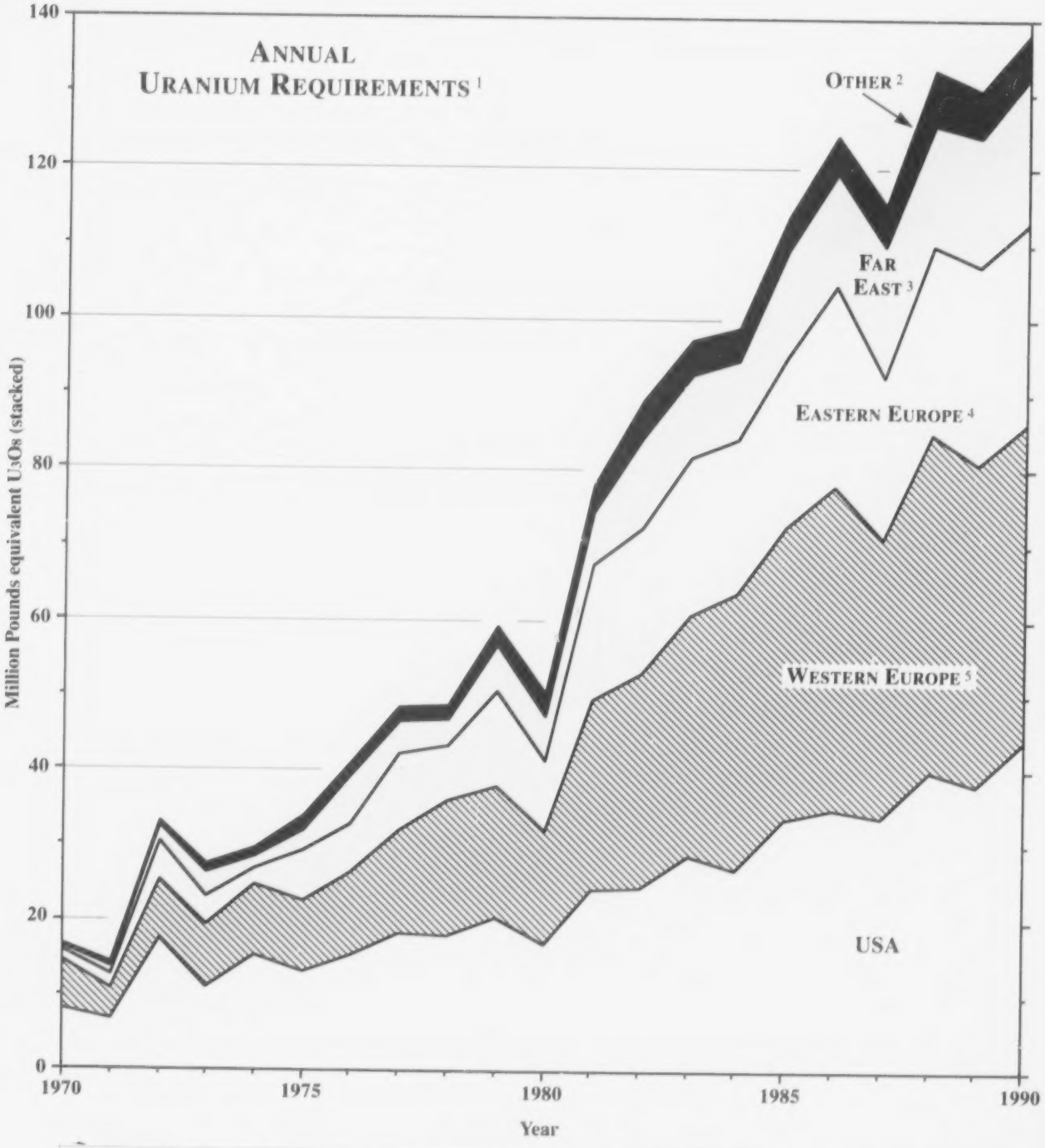
HISTORICAL MARKET DATA



[1] Calculated by NUEXCO based on actual completion dates and operating performance, and NUEXCO's estimate of enriching tails assay.
[2] **Other** includes: Argentina, Brazil, Canada, India, Mexico, Pakistan, and South Africa.
[3] **Far East** includes: Japan, People's Republic of China, South Korea, and Taiwan.
[4] **Eastern Europe** includes: Bulgaria, Czechoslovakia, E. Germany, Finland, Hungary, USSR, and Yugoslavia.
[5] **Western Europe** includes: Belgium, France, W. Germany, Italy, The Netherlands, Spain, Sweden, Switzerland, and UK.

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Australia

Year	Period [1]	Consumer Price Index [2] (1980/1981 = 100)	Price Index of Materials Used in Manufacturing Industry — All Groups [3] (1984/1985 = 100)	Average Weekly Ordinary Time Earnings — Adult Males — Australia [4] (Australian dollars)	Award Rates of Pay Indexes Australia - Adult Males In Mining Wage Earners, Weekly Rates [5] (June 1985=100)
1980	Avg.	95.8	83.1	—	69.6
1981	Avg.	105.0	85.9	—	76.1
1982	Avg.	116.7	89.0	—	86.4
1983	Avg.	128.5	96.9	—	89.9
1984	Avg.	133.6	98.0	—	96.0
1985	Avg.	142.6	107.3	—	100.0
1986	Avg.	155.5	101.5	—	104.9
1987	Avg.	168.7	108.9	465.88	112.9
1988	Avg.	180.9	111.8	496.90	115.4
1989	Avg.	194.6	117.0	534.65	126.0
1990	Avg.	208.7	123.4	571.43	129.7 R
Jan	1990	—	119.2	—	128.3
Feb	1990	—	120.8	555.80	128.3
Mar	1990	204.1	121.5	—	128.7
Apr	1990	—	119.9	—	129.0
May	1990	—	118.9	566.60	129.2
June	1990	207.4	116.6	—	129.8
July	1990	—	116.4	—	129.9
Aug	1990	—	122.4	574.10	130.0
Sept	1990	208.9	128.2	—	130.3
Oct	1990	—	134.1	—	130.7 R
Nov	1990	—	133.7	589.20	130.7 R
Dec	1990	214.5	128.8	—	130.9 R
Jan	1991	—	125.6	—	130.9 R
Feb	1991	—	121.5	597.70	130.9 R
Mar	1991	214.1	119.1	—	131.1 R
Apr	1991	—	117.6	—	131.3 R
May	1991	—	117.8	592.00	131.3 R
June	1991	214.4	120.4	—	131.3 R
July	1991	—	120.4	—	131.3 R
Aug	1991	—	119.9	599.50	131.7 R
Sept	1991	—	118.3	—	131.9 R
Oct	1991	—	118.7	—	132.0

P = Preliminary **R** = Revised since last month

[1] Monthly data for the period 1967 to 1990 appears in Report 278.
[2] Weighted average of six State capital cities (1975 to 1980), and eight capital cities from 1981 (Base: Financial year July 1980 to June 1981 = 100.0). Figures shown at end of quarter represent quarterly average.
[3] Australian Bureau of Statistics, Canberra: "Price Index of Materials Used in Manufacturing Industry" (Catalogue No. 6411.0).
[4] Australian Bureau of Statistics, Canberra: "Award Rates of Pay Indexes, Australia" (Catalogue No. 6312.0). Figures for the latest fourteen months shown are subject to revision.
[5] Australian Bureau of Statistics, Canberra: "Average Weekly Earnings, States & Australia" (Catalogue No. 6302.0).

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GOVERNMENT STATISTICS

Canada

		Industrial Products Price Index: All Commodities [1] (1986 = 100) [2]	Consumer Price Index: All Items (1986 = 100) [3]	Wage-earner Data: Average Hourly Earnings (C$) [4]				
				Uranium Mines (SIC 057)	Metal Mines (SIC 051-059)	Mines, Quarries and Oil Wells (SIC 051-099)	Metal Rolling, Casting and Extruding (SIC 298)	Chemicals and Chemical Products Industries (SIC 372-379)
1980	Avg.	75.9	67.2	—·—	—·—	—·—	—·—	—·—
1981	Avg.	83.6	75.5	—·—	—·—	—·—	—·—	—·—
1982	Avg.	89.0	83.7	—·—	—·—	—·—	—·—	—·—
1983	Avg.	92.1	88.5	17.22	14.86	14.18	10.67	11.09
1984	Avg.	96.3	92.4	17.89	15.85	14.97	11.11	11.68
1985	Avg.	99.0	96.0	18.53	16.47	15.56	11.85	12.12
1986	Avg.	100.0	100.0	19.38	16.70	15.76	12.28	12.58
1987	Avg.	102.8	104.4	20.12	17.15	16.11	12.58	13.20
1988	Avg.	107.2	108.6	20.91	18.51	16.95	13.17	13.77
1989	Avg.	109.4	114.0	21.97	20.02	18.41	13.71	14.16
1990	Avg.	109.7	119.4	22.90	20.93	19.12	14.62	15.28
Jan	1991	111.1	125.0	23.79	21.79	19.78	14.66	15.89
Feb	1991	110.6	125.0	25.23	22.45	20.13	14.63	16.10
Mar	1991	109.8	125.5	24.19	22.22	20.27	15.21	16.47
Apr	1991	109.1	125.5	24.77	22.50	20.31	14.63	16.64
May	1991	108.6	126.1	24.38	22.17	20.25	15.05	16.55
June	1991	108.5	126.7	23.58	22.13	19.90	14.65	16.51
July	1991	108.2	126.8	24.70	22.33	19.93	14.56	16.36
Aug	1991	107.8	126.9	23.78	22.01	20.00	14.62	16.24
Sept	1991	107.6	126.7	24.23	22.27 R	20.38 R	14.89 R	16.47 R
Oct	1991	107.6	126.5	24.44 P	22.16 P	20.41 P	15.06 P	16.47 P
Nov	1991	—	127.0	—·—	—·—	—·—	—·—	—·—

P = Preliminary **R** = Revised since last month

[1] Statistics Canada, Prices Division, Ottawa: "Industry Price Indexes" (Catalogue 62-011). Indexes for the most recent six months shown are subject to revision. This category was formerly known as "Manufacturing." Monthly data for the period 1967 to 1990 is found in Report 278.

[2] New Base Year of 1986 as of Report 266. Previous Base Year was 1981.

[3] New Base Year of 1986 as of Report 264. Previous Base Year was 1981.

[4] Statistics Canada, Labour Division, Employment and Payrolls Section, Ottawa: "Employment, Earnings and Hours." Monthly data for the period 1983 to 1990 is found in Report 278.

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South Africa

		Average Declared Working Costs per Metric Ton of Gold Ore Milled[1] (Rand)	Tonnage-Weighted Index of Average Working Costs per Metric Ton of Gold Ore Milled[2] (March 1982 = 100)	Consumer Price Index[3] (1990 = 100)	Production Price Index All Groups[4] (1985 = 100)	Total Employment in Mining and Quarrying[5]	Total Salaries and Wages in Mining and Quarrying[5] (1,000 Rand)
							Annual Total[6]
1980	Avg.	35.50	—	25.5	55.2	709,042	2,237,689
1981	Avg.	41.87	—	29.4	62.7	722,918	2,756,928
1982	Avg.	47.23	103.9	33.7	71.4	702,041	3,181,584
1983	Avg.	51.88	115.0	37.8	79.0	700,901	3,563,282
1984	Avg.	58.95	130.3	42.2	85.6	711,511	4,134,390
1985	Avg.	68.70	151.7	49.1	100.0	724,587	4,778,612
1986	Avg.	80.18	177.9	58.2	119.6	756,637	5,767,950
1987	Avg.	95.01	223.1	67.6	136.2	751,864	6,911,395
1988	Avg.	106.69	241.1	76.2	154.1	705,355	7,774,054
1989	Avg.	116.65	273.0	87.4	177.5	700,360	8,833,934
1990	Avg.	129.37	305.3	100.0	198.9	677,742	10,193,209
							Monthly Total
Jan	1991	—	—	107.7	216.1	648,944	935,839
Feb	1991	—	—	109.0	216.9	650,948	893,373
Mar	1991	137.66	323.82	110.0	215.3	651,843	924,930
Apr	1991	—	—	111.5	216.5	639,939	887,722
May	1991	—	—	113.2	218.4	630,481	887,107
June	1991	134.65	317.23	114.0	219.3	640,908 R	890,595
July	1991	—	—	115.5	221.2	637,581	881,182 R
Aug	1991	—	—	117.1	222.8	613,704	934,308
Sept	1991	137.11	329.05	118.7	225.2	—	—
Oct	1991	—	—	119.8 R	228.3	—	—

P = Preliminary **R** = Revised since last month

[1] Chamber of Mines of South Africa, Johannesburg: "Analysis of Working Results," published quarterly. Historical Data by month appears in Report 278.
[2] Page 16 of Report 178 contains description and calculation of index.
[3] Central Statistical Service, Pretoria: All income groups-weighted average, Historical Data by month appears in Report 278.
[4] Central Statistical Service, Pretoria: All commodities for consumption in South Africa.
[5] Central Statistical Service, Pretoria: Historical Data by month appears in Report 236.
[6] Annual total is shown, rather than monthly average, for indicated year.

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GOVERNMENT STATISTICS

United States

		Producer Price Index [1]		Consumer Price Index [2]	GNP Implicit Price Deflator [3]	Gross Average Hourly Earnings of Production or Non-supervisory Workers (US$) [4]			
		Industrial Commodities (1982 = 100)	All Commodities (1982 = 100)	(1982-1984 = 100)	(1982 = 100)	Metal Mining (SIC 10)	Primary Non-ferrous Metals (SIC 333)	Chemicals and Allied Products (SIC 28)	Electric and Electronic Equipment (SIC 36)
1980	Avg.	88.0	89.8	82.4	85.7	10.26	10.63	8.31	6.94
1981	Avg.	97.4	98.0	90.9	94.0	11.55	11.98	9.12	7.62
1982	Avg.	100.0	100.0	96.5	100.0	12.31	12.93	9.96	8.21
1983	Avg.	101.1	101.3	99.6	103.9	12.58	13.43	10.58	8.66
1984	Avg.	103.3	103.7	103.9	107.7	13.05	13.43	11.07	9.04
1985	Avg.	103.7	103.2	107.6	110.9	13.38	13.74	11.57	9.46
1986	Avg.	100.0	100.2	109.6	113.9	12.46	13.48	11.98	9.65
1987	Avg.	102.6	102.8	113.6	117.7	12.52	12.98	12.37	9.88
1988	Avg.	106.3	106.9	118.3	121.3	13.24	13.26	12.71	9.79
1989	Avg.	111.6	112.2	124.0	126.3	13.59	13.72	13.09	10.05
1990	Avg.	115.8	116.3	130.7	131.5	14.10	14.36	13.54	10.32
Jan	1991	119.3	119.0	134.6	—	14.73	14.63	13.85	10.60
Feb	1991	117.2	117.2	134.8	—	14.80	14.55	13.81	10.59
Mar	1991	115.6	116 1	135.0	134.8	14.93	14.55	13.85	10.55
Apr	1991	115.6	116.0	135.2	—	14.85	14.56	13.96	10.63
May	1991	116.1	116.5	135.6	—	14.79	14.52	14.01	10.66
June	1991	116.1	116.4	136.0	136.1	14.88	14.51	14.05	10.74
July	1991	116.0	116.1 R	136.2	—	15.09	14.56	14.16	10.77
Aug	1991	116.4	116.2	136.6	—	14.82	14.64	14.06	10.78
Sept	1991	116.2	116.0	137.2	136.9	15.04 R	14.59 R	14.21 R	10.84 R
Oct	1991	116.6	116.4	137.4	—	14.95 P	14.76 P	14.25 R	10.75 R
Nov	1991	116.7	116.4	137.8	—	—·—	—·—	14.38 P	10.85 P

P = Preliminary R = Revised since last month

[1] US Bureau of Labor Statistics, Washington, DC: "Producer Prices and Price Indexes," (formerly "Wholesale Prices and Price Indexes"). Producer Price Indexes are revised four months after they are first released to reflect the availability of late reports and corrections by respondents Historical ata is presented in Report 278.

[2] US Bureau of Labor Statistics, Washington, DC: Consumer Price Index for All Urban Consumers, US City Average, All Items. Historical data is presented in Report 278.

[3] US Department of Commerce, Washington, DC: Bureau of Economic Analysis, National Income and Wealth Division: "Survey of Current Business." The GNP Implicit Price Deflator is published quarterly, and seasonally adjusted. Historical data is presented in Report 278.

[4] US Bureau of Labor Statistics, Washington, DC: "Employment and Earnings." All data based on 1972 revision of SIC Manual. Historical data is presented in Report 278.

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US Uranium Marketing Activities Statistics

— Compiled from data published by the US Energy Information Administration [1] —

Year	Total Production (million pounds U_3O_8)	Deliveries to Domestic Utilities From US Suppliers [2] (million pounds U_3O_8)	Average Price of Delivered Uranium [2] ($/lb. U_3O_8)	Quantity of Uranium Imported [3] (million pounds U_3O_8)	Average Price of Imported Uranium ($/lb. U_3O_8)	Quantity of Uranium Exported (million pounds U_3O_8)
1976	25.5	27.6	$16.10	3.6	n/a	1.2
1977	29.9	27.8	$19.75	5.6	n/a	4.0
1978	37.0	31.6	$21.60	5.2	n/a	6.8
1979	37.5	33.0	$23.85	3.0	n/a	6.2
1980	43.7	35.0	$28.15	3.6	$43.10	5.8
1981	38.5	32.6	$34.65	6.6	$32.90	4.4
1982	26.9	23.5	$38.37	17.1	$25.19	6.2
1983	21.2	24.2	$38.21	8.2	$26.16	3.3
1984	14.9	22.5	$32.65	12.5	$21.86	2.2
1985	11.3	21.7	$31.43	11.7	$20.08	5.3
1986	13.5	18.9	$30.01	13.5	$20.07	1.6
1987	13.0	20.8	$27.37	15.1	$19.14	1.0
1988	13.1	17.6	$26.15	15.8	$19.03	3.3
1989	13.8	18.4	$19.56	13.1	$16.75	2.1
1990	8.9	20.5	$15.70	23.7	$12.55	2.0

P = Preliminary **R** = Revised since last month

[1] Sources: 1976-1983: US Department of Energy/Energy Information Administration, *Survey of United States Marketing Activity*.
1984-1990: Energy Information Administration, *Uranium Industry Annual*.

[2] Data for 1976-1981 includes both domestic utilities and agents.

[3] Includes imports by domestic utilities and domestic suppliers.

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GOVERNMENT STATISTICS

Volume and Price of Uranium Deliveries To The European Community [1]

— Compiled from data published by the Euratom Supply Agency —

Year	Volume of Deliveries to the EC [2] (MTU)	Percentage of Deliveries Made Under Spot Contracts	Medium or Long-Term Contracts [3] Average Price		Spot Contracts [3] Average Price	
			in ECU per pound U_3O_8	in US Dollars per pound U_3O_8	in ECU per pound U_3O_8	in US Dollars per pound U_3O_8
1977	n/a	n/a	n/a	n/a	n/a	$41.00
1978	n/a	n/a	n/a	n/a	n/a	$43.00
1979—	10,000	n/a	n/a	n/a	n/a	$44.50
1980	8,600	n/a	n/a	$36.00	n/a	$35.00
1981	13,000	less than 10	n/a	$33.25	n/a	$28.00
1982	12,500	less than 10	ECU 32.25	$32.00	ECU 24.25	$24.00
1983	13,500	less than 10	ECU 34.75	$31.00	ECU 26.00	$23.25
1984	11,000	less than 10	ECU 37.75	$29.75	ECU 24.50	$19.25
1985	11,000	11.5	ECU 38.00	$29.00	ECU 19.50	$15.00
1986	12,000	9.5	ECU 31.50	$31.00	ECU 18.00	$17.75
1987	14,000	17.0	ECU 28.25	$32.50	ECU 15.00	$17.25
1988	12,500	4.5	ECU 26.92	$31.82	ECU 13.65	$16.13
1989	13,500	11.5	ECU 26.63	$29.35	ECU 11.04	$12.19
1990	12,800	16.7	ECU 23.08	$29.39	ECU 7.60	$ 9.68

P = Preliminary **R** = Revised since last month

[1] The twelve European Community member nations are Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, Portugal, Spain, and the United Kingdom; prior to January 1986, Spain and Portugal were not members of the EEC.

[2] The only deliveries taken into account are those made to final users, namely the electric utilities or their procurement organizations; deliveries to middlemen or fuel cycle companies are not included. The sales between utilities in the Community are also excluded. The quantities covered are those which were entered into accounting records during the year stated.

[3] For deliveries made under medium or long-term contracts (i.e., for which the time between the date of signature and the date of the last delivery exceeds one year) the prices were expressed in seven different currencies. In order to calculate an average price, these prices have been converted into European Currency Units (ECU) and US dollars. The average prices were weighted by quantity and converted on the basis of the average annual exchange rate of the different currencies against the ECU and US dollar. Exchange rates are published by European Communities Statistical Office and the International Monetary Fund.

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